



# **FROM PILES TO FILES**

**Max Anderson**

**2001**







# **FROM PILES TO FILES**

**OR**

# **THE NEXT TWENTY YEARS**

Max Anderson  
Attadale August 2001



# FROM PILES TO FILES

## Preface

In 1995, I put together some of my experiences as a young engineer in the Public Works Department of Western Australia, which I called "Twenty Years in the Field".

Following my transfer from Derby to Perth 1965, I became just another face in the crowd in the Head Office of the Public Works Department, which was then housed in the old Barracks building at the western end of St. George's Terrace.

My experiences in this new environment did not present the same interest, which I felt existed in the field situation, where people were more important than dredging logs and pile driving records.

However, I felt that I should put down something to account for the next twenty years I worked in the Public Works Department, the title of which I felt summed it all up - "From Piles to Files".

It has been divided into two sections, the first being the works carried out by the Harbours and Rivers Branch of the Engineering Division of the Public Works Department between 1950 and 1985 and the second covering some human interest stories with relevance to both the previous twenty years and the transition period into the next twenty years.

Max Anderson  
August 2001



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Branch of the Public Works Department of Western  
Australia

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**THE NEXT TWENTY  
YEARS**

**SECTION ONE**

**WORKS CARRIED OUT BY  
THE**

**HARBOURS AND RIVERS  
BRANCH**

**OF THE**

**PUBLIC WORKS  
DEPARTMENT**

**WESTERN AUSTRALIA 1950 -  
1985**

**and in particular from 1965 -  
1985**



## Imperial to Metric Conversion

All units have been expressed as those applying at the time and no attempt has been made to convert them from imperial to metric.

### *Currency*

**One pound** = 20 shillings = 240 pence = \$ 2

### *Weights and Measures*

**Length** One inch = 2.54centimetres One foot  
30.84centimetres

One yard = 3 feet= 0.914 metres

One chain = 66 feet 20.12 metres

One mile = 80 chains 5289 feet  
1609 metres

**Area** One acre = 43,560 sq feet  
0.4047 hectares

**Volume** One cubic foot = 0.0283 cubic . metres  
One cubic yard .7646 cubic metres.

One acre foot = 271,300 gallons -  
1233 cubic metres

One million imperial gallons= 4546 cubic m.

One gallon = 4.546 litres

**Weight** One ton =1.016 tonnes

### **Pressure**

One pound per square inch = 6.895 kilopascals

### **Temperature**

32 degrees Fahrenheit 0 degrees Centigrade

212 degrees Fahrenheit 100 degrees Centigrade

100 degrees Fahrenheit 38 degrees Centigrade



## **A Brief History of Port Development in Western Australia**

Possibly the most active period in the provision of marine facilities in the history of Western Australia took place between 1880 and 1910. During this period new jetties or landings were constructed or existing facilities were extended at Albany, Balla Balla, Broome, Bunbury, Busselton, Carnarvon, Derby Cossack, Dongara, Esperance, Eucla, Flinders Bay, Fremantle, Geraldton, Onslow, Hamelin Bay, Hopetoun, Israelite Bay, Mandurah, Maud's Landing, Point Samson, Port Hedland, Quindalup, Rockingham, Wonnerup and Wyndham.

All of these structures were of a basic design, generally using Western Australian hardwoods for all the components of the Jetty. The basic Jetty was a timber piled structure with two adzed or sawn timber half caps at each pier, with the pier centres being in the order of 12 feet. The Jetty super structure comprised transverse 9 inch by 4 inch decking, spiked to longitudinal 12 inch by 6 inch beams, generally staggered over the piers so that each beam was supported on three sets of half caps. In some cases short lengths of timbers, known as corbels supported the beams over the half caps to reduce the free span of the beams and so improve the loading capacity of the deck.

The lower part of the structure was braced with horizontal waling pieces bolted to the piles near low water mark and cross bracing timbers bolted to the piles just above the walings and just below the halfcaps.

Most jetties carried a light railway for transporting goods between the shore and the berthing head of the Jetty. Unloading and loading of goods on shore was normally carried out manually, although light fixed one ton capacity hand cranes were sometimes used in the goods yards on shore. The loading or unloading of cargo at the berthing head was generally carried out using ship's gear.



Jetties were designed mainly for the vertical loads imposed on them by cargo loading and deck traffic with some allowance for transverse loads caused by weather and shipping. In order to reduce berthing loads, a separate fender system was sometimes used which was supported by piles and timbers independent of the jetty structure

Although this reduced the transverse loading from shipping it had the opposite effect on the Jetty when it came to adverse sea conditions. Many a fender system under severe storm conditions became a gigantic battering ram to the Jetty itself, resulting in the loss of all or part of the Jetty.

The height of the Jetty deck above high water also created a problem. If the deck was too high it was some times too difficult to work a vessel at other than high tides.

If the deck was too low it was prone to uplift during storms. This was particularly a problem in the northwest ports of the State where a high tidal range dictated a lower deck level, making the structure more vulnerable to storm or- cyclone damage, particularly if the storm or cyclone hit at high tide.

Jetties or landings were located primarily from a land use aspect, which meant that many structures were not necessarily built in the best location with respect to shelter and depth of water.

These early structures played a very important part in the opening up of the State. They preceded road and rail and provided the only means of transport from Eucla to Wyndham. - At the turn of the previous Century, rail was replacing intra state sea transport in the south. With the relatively recent advent of all weather roads in the north of the State, road has now replaced the majority of intra state sea transport since the 1970s.

Up to 1897 cargo in the State was handled over timber Jetties similar to the type described above. These structures were continually being extended and strengthened to meet shipping requirements both in draft and size. In 1897 the first facility of this type was replaced with land backed wharves, in the development of the inner harbor at Fremantle. However apart from



Fremantle all other ports in the State continued to use jetties for loading and unloading cargo. The first regional port to replace its Jetty with a land backed berth was Geraldton when the first of three land backed wharves was commissioned in 1930. This was followed by Albany, with the first land backed berth being constructed in 1954.

It was not until the 1960s that the next expansion of ports took place, as a result of the increase in the mining, pastoral & agricultural industries. At the same time there was also an up turn in the fisheries which resulted in new and upgraded facilities for the fishing industry being provided at Esperance, Hopetoun, Albany Augusta, Bunbury, Mandurah, Fremantle, Lancelin, Cervantes, Jurien Bay, Leeman, Port Denison, Geraldton, Port Gregory, Denham (Shark, Bay), Carnarvon and Point Samson

Between 1960 and 1970 all of the existing timber jetties still being used at that time for port activities were replaced, supplemented or modified. The three jetties at the Kimberley Ports of Wyndham, Derby & Broome were replaced with steel and concrete

The jetties at Wyndham and Derby were built on the same site whilst the one at Broome was relocated at Entrance Point, five kilometres from the site of the timber jetty.

Due to the large tidal range at the Kimberley ports economics ruled out the replacement of these jetties with the more versatile land backed wharf. However provision was made on all three jetties for through or turnabout road traffic between the shore and the berthing head. In the case of Wyndham and Derby, provision for rail traffic was originally retained on the new structures. During the same period extensive works were also carried out at the regional ports of Albany, Bunbury, Esperance, Geraldton and Port Hedland. It was also in this period that Company iron ore export ports were established at Finucane Island, Port Hedland for Goldsworthy Mining Pty Ltd; Port Hedland for Mount Newman Mining Pty Ltd; Cape Lambert near Point Samson for Robe River Mining Pty Ltd and Dampier for Hamersley Iron Pty Ltd. Salt export facilities were also established at Port Hedland;



Dampier; Useless Loop at Shark Bay and Cape Cuvier, about 100 kms north of Carnarvon. A wood chip export facility was established at Bunbury together with a loading berth for the export of alumina.

As always, the design of all the structures was dictated by the type of vessel which would be using the facility with respect to draft, loaded displacement, shape, length and beam, the type of cargo being carried by the ship, the handling facility on the ship and that required on the structure.

This covered conventional merchant ships, bulk carriers, container ships, specialized ships used for the carrying of livestock and car "ferries". With the introduction of large bulk carriers requiring heavy loading or unloading installations at the berth and with specialized container ships with stern or quarter-ramps, requiring heavy strength deck sections, the type of structure, which had almost been standard for the last eighty years, underwent a great change. Timber piles were replaced with tubular steel piles and the whole timber super structure was replaced with reinforced concrete.

I was indeed most fortunate to be a part of port development in this State in the second part of the last century.



# **WORKS CARRIED OUT BY THE HARBOURS AND RIVERS BRANCH OF THE PUBLIC WORKS DEPARTMENT OF WESTERN AUSTRALIA IN THE SECOND HALF OF THE 20TH CENTURY**

The following engineering projects were carried out by the Harbours and Rivers Branch of the Public Works Department of Western Australia between 1950 and its demise in 1985.

The projects have been shown in alphabetical rather than in geographical order and cover the periods 1950 to 1970, 1970/1971, 1971/72, 1972/73, 1973/74 to 1974/75, 1975/76 to 1976/77, 1977/78, to 1979/80, 1980/81 to 1981/82 and 1982/83 to 1984/85.



# **1 MARINE WORKS 1950 to 1970**

Between 1950 and 1970 extensive marine works were carried out throughout the State at Albany. Augusta, Broome, Bunbury, Busselton, Carnarvon, Derby, Esperance, Fremantle, Geraldton, Mandurah, Onslow, Point Samson, Port Hedland and Wyndham by the Harbours and Rivers Branch of the Public Works Department of Western Australia.

**Albany**

**Broome**

**Busselton**

**Derby**

**Fremantle**

**Mandurah**

**Point Samson**

**Wyndham**

**Augusta**

**Bunbury**

**Carnarvon**

**Esperance**

**Geraldton**

**Onslow**

**Port Hedland**

## **Albany**

During this period two land backed berths were constructed at Albany and a new transit shed was built behind No I berth. Dredging of the harbour in two areas to 36 feet and 33 feet was carried out by Australian Dredging and General Works prior to awarding a contract to PDC Construction Pty Ltd. in December 1969 for the construction of a third land backed berth.

A small boat harbor was constructed for the fishing Industry at Emu Point, which included a dredged approach channel and a mooring basin and the provision of jetties and mooring facilities.

## **Augusta**

To provide small craft access from Hardy Inlet into the Blackwood River at Augusta a channel was blasted through Hardy Inlet in the early 1950s. At



that time there were no public Jetties or mooring facilities at Augusta.

## **Broome**

Apart from the continual maintenance of the timber Jetty at Mangrove Point there was very little port activity until 1965/66 when a steel tubular piled Jetty with a steel and concrete was constructed at Entrance Point, which was L shaped with a 2,296 feet length by 24 feet wide neck and a 600 feet by 86 feet wide head, carrying a 91.4m x 10.7m transit shed.

## **Bunbury**

Following the reballasting and upgrading of the rail sidings to Roelands Quarry in 1947 the quarry was reopened and rock became available in May 1947 for the extension of the Bunbury Harbour breakwater, A new ocean outlet for the Leschenault Estuary was completed in May 1951 and a 600 feet by 87 feet wide extension of the timber Jetty, commenced in 1951, was completed in 1956.

A contract was let to John Holland- Robinson Pty Ltd in January 1962 for 388,000 pounds for the construction of a 600 feet length reinforced concrete pile and deck land backed berth alongside the breakwater in the outer harbour. The purpose of this berth was for the handling of sulphur and phosphate using road transport. In April 1965, tenders were called for a second breakwater berth, the contract being awarded to John Holland Constructions Pty. Ltd. for 481,063 pounds with the berth coming into operation in September 1966.

During this period the timber viaduct to the jetty berths was replaced with a solid fill embankment and a new 80 ton capacity slipway was constructed off reclaimed land shoreward of the breakwater berths.

In 1969 work began on the construction of a new inner harbour at Bunbury, located within the Leschenault Estuary, south of the State Electricity Power Station on the north shore. A contract was awarded to Dredging Industries for the dredging of



700,000 cubic yards of sand from the inner basin to provide reclaimed land for the relocation of existing services.

Circulating water intakes and foundations for the State Electricity Commission's Generating Station on the north shore were constructed by the day labour organization

The effluent pipeline structure for Laporte was constricted and works were carried on the rebuilding of five of the jetty berths.

## **Busselton**

The original timber Jetty at Busselton, which was built in 1864/65 was 528 feet in length. Between 1875 and 1961 it was extended eight times, with the last extension resulting in a Jetty with a total length of 6306 feet being carried out in 1960/61.

## **Carnarvon**

In common with the other timber jetties in the north of the State the main work which was carried out to the Carnarvon Jetty over this period was the continual replacement of timber piles and the ongoing maintenance of the rail sidings between the Jetty and the goods yard on shore. Maintenance costs at Carnarvon were particularly high due to the long Jetty length and the two rail bridges between the Jetty and the town. The Jetty was eventually closed to general cargo and used only as an oil receival facility. As incongruous as it may sound, one of the main imports over the Carnarvon Jetty in the mid 1960s were timber piles.

## **Derby**

Apart from the ongoing maintenance of the 1885 timber Jetty and its associated ancillaries no major port works took place until 1964 when the old timber Jetty was replaced with a steel tubular pile, steel and concrete decked structure located adjacent to the



existing Jetty. The new Jetty comprised a 758 feet long by 26 feet width northern curved approach neck leading to a 516 feet long berth. with 83.5m x 29m transit shed located at the berth. At the southern end an 18 feet width neck carried a cattle race and a return roadway from the Jetty head

The old timber Jetty was demolished early in 1965.

## **Esperance**

Between 1962 and 1965 a 3425 feet length breakwater was constructed off Dempster Head. In 1963 a contract was awarded to Dredging Industries (WA) for the removal of 2.5 million cubic yards of sand from the entrance channel and inner basin. The contract was completed in 1965.

During 1964/65 a 634 feet length land backed berth was constructed by John Holland Constructions Pty. Ltd. and the new harbour was opened by Premier Brand on November 19 1965.

In the late 1960s fishing craft facilities were provided along the foreshore between James and Taylor Streets, A Jetty was built near Taylor Street and a slipway /launching ramp was built just south of James Street.

## **Fremantle**

Major improvements were carried out to the fishing boat harbour between 1960 and 1970. To provide added protection, a southern breakwater was built in 1961/62.

The dredge Stirling removed 750,000 cubic yards of spoil from within the harbour which was pumped to reclamation on the harbour periphery, with the reclaimed land being developed for port related activities. A steel sheet pile land backed wharf was built in 1963/64, followed by a 600 feet extension of the southern breakwater in 1967/68 together with the provision of the first stage of mooring pens in the now protective water area, together with an extension of the



northern breakwater and additional pens on the south side of the harbour.

## **Geraldton**

Since the completion of the 1350 feet length of land backed wharves in the 1930s very little port improvements took place until 1962 when a contract was awarded to Dredging Industries WA for the dredging of part of the harbour basin required for the next land backed berth (No 4) which comprised concrete filled octagonal steel piles and a reinforced concrete deck supported on longitudinal steel beams and steel headstocks. This berth was built by the Harbours and Rivers day labour organisation between 1964 and 1966

A 300 feet length steel sheet pile wharf for fishing vessels was built at the western of the main harbour in 1961.

## **Mandurah**

In this 20 year period extensive work to combat coastal erosion and siltation problems at the ocean entrance to Peel Inlet was carried out involving the building of two training walls (breakwaters) at the entrance to Peel Inlet together with the provision of launching ramps, jetties and navigational markers.

## **Onslow**

The Onslow Jetty, which was badly damaged by a cyclone on March 22 1953, required the replacement of 240 piles throughout the structure. Two more cyclones struck in March 1958 breaking 73 piles. The first of three cyclones in January 1961 carried away 975 feet of the seaward end of the Jetty.

Following this damage it was decided not to rebuild the Jetty and a lighter berth was established at the shoreward end of the Jetty from which the 88 feet length Lighter "Ashburton" operated.



In 1966 the lighter berth was transferred from the Jetty to Beadon Creek, where a 2000 ft. length groyne was constructed on the south side of the ocean entrance to the Creek together with the dredging of a permanent channel to the lighter berth.

## **Point Samson**

The original 1904 Jetty at Point Samson, was almost completely destroyed by a cyclone in 1925. A second Jetty on the same site was built between 1936 and 1937. The 2,267 ft. long Jetty was officially opened by the Minister for the North West on Feb 7 1938. Due to teredo worm action and cyclones pile replacements were a continuous programme. Between 1950 and 1970 every pile in the structure had been replaced.

## **Port Hedland**

Apart from continual maintenance, very little work was done on the 1909 timber Jetty and it was not until 1957 that improvements were carried out to the port in the revamping of the existing Jetty to provide two 350 feet length berths, one for manganese and one for general cargo. In 1967 a contract was awarded to PDC Constructions Pty Ltd for the construction of a 600 feet length land backed berth to handle general cargo, the export of salt and the import of mining equipment for the Mt Newman Mining Company. The new berth, which was completed in August 1968, was opened by the Minister for Works on February 18<sup>th</sup> 1969

## **Wyndham**

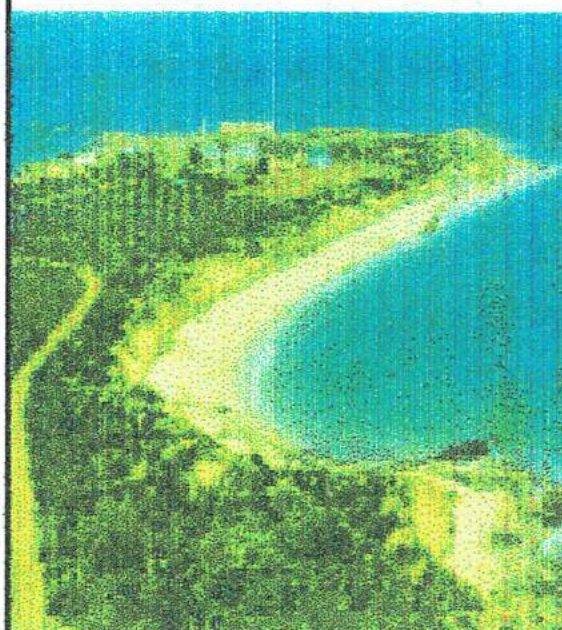
During this period the 1918 timber Jetty at Stony Point, known as the Meatworks Jetty, was replaced with a steel tubular piled Jetty with longitudinal steel beams, transverse timber beams and longitudinal decking. The work commenced in 1959 and was completed in 1961.





*Top **Broome**  
Deepwater Jetty at  
Entrance Point, about 7  
kms from Broome*

*Right – Aerial view of  
Riddell Beach looking  
towards Entrance Point,  
The Port installations can  
be seen in the background  
with the jetty neck  
abutment at top far left.*

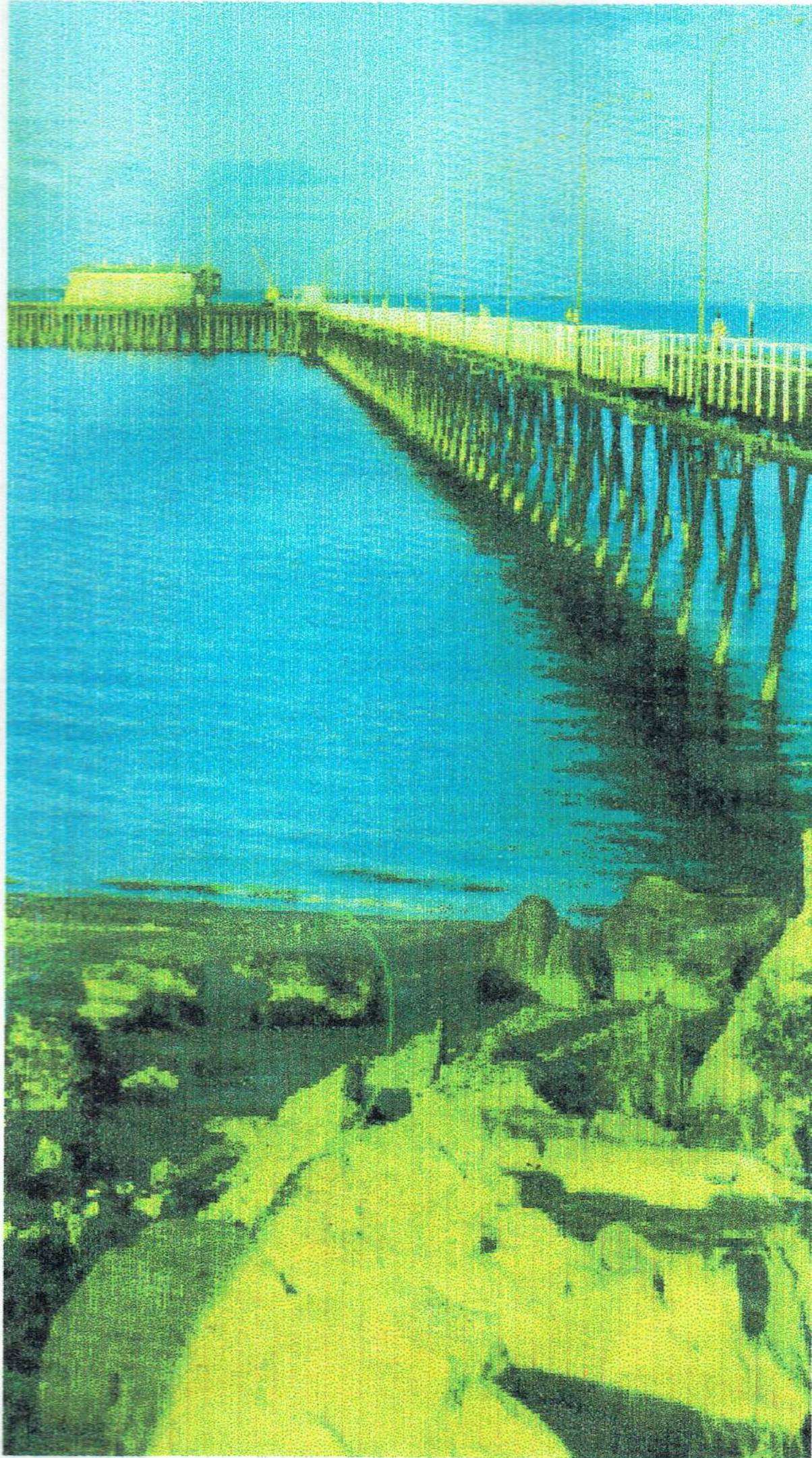


*Below – The berthing head  
of the Broome Jetty with  
the naval vessel Hobart  
alongside.*

*These photographs  
were taken in 1993*

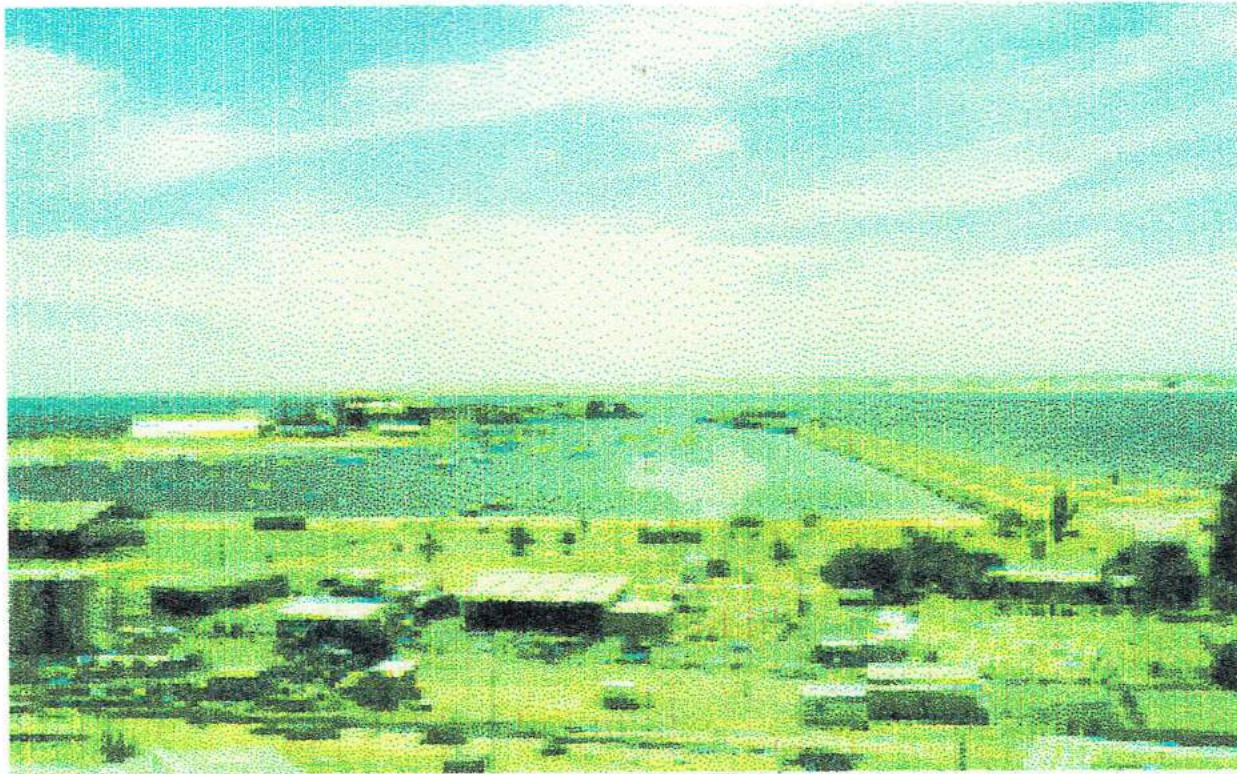




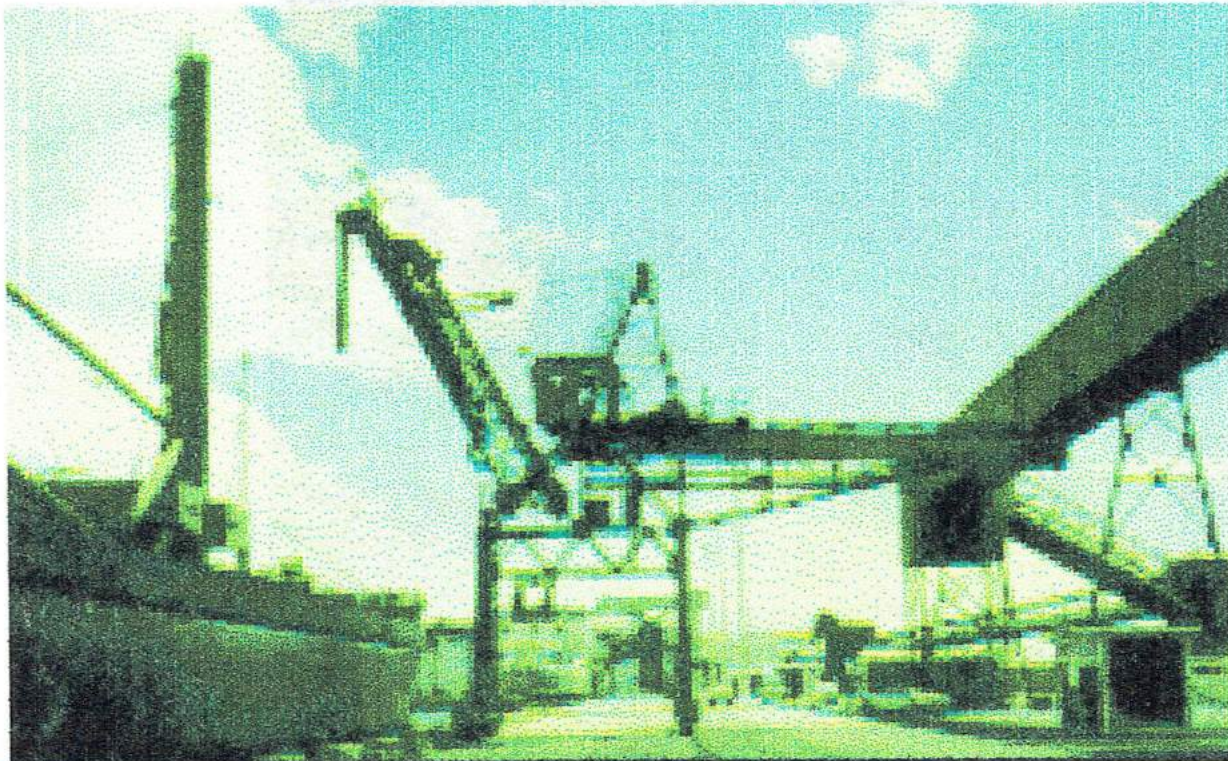


*Broome Deepwater Jetty at Entrance Point*





***Bunbury Harbour*** – A general view overlooking the outer harbour with the two breakwater berths and mineral sands loading facilities on the top left and the causeway approach to the jetty berths at lower right.



***Bunbury Harbour*** the mineral sands loader at the No 1 outer harbour berth. The berth was 184 m long with a 15.85 m apron and was designed for a stack loading of 3400 kg.m<sup>2</sup>. The original fender system was replaced with Seibu C type rubber fenders allowing for the berthing load of a vessel with a 20,000 tonnes displacement. The ship loading rate was 900tph for mineral sands. Both photographs taken circa 1990.





*Above – the end of the **Busselton** jetty looking towards the shore*

*Below – the foreshore at **Busselton**. Both photographs taken in 1994*







*Above – The **Carnarvon Jetty** looking towards the head, taken from a sandbank about one third of the way down the jetty neck.*

*Below – The underside of the Carnarvon showing a typical timber jetty. Both photographs taken July 1994.*



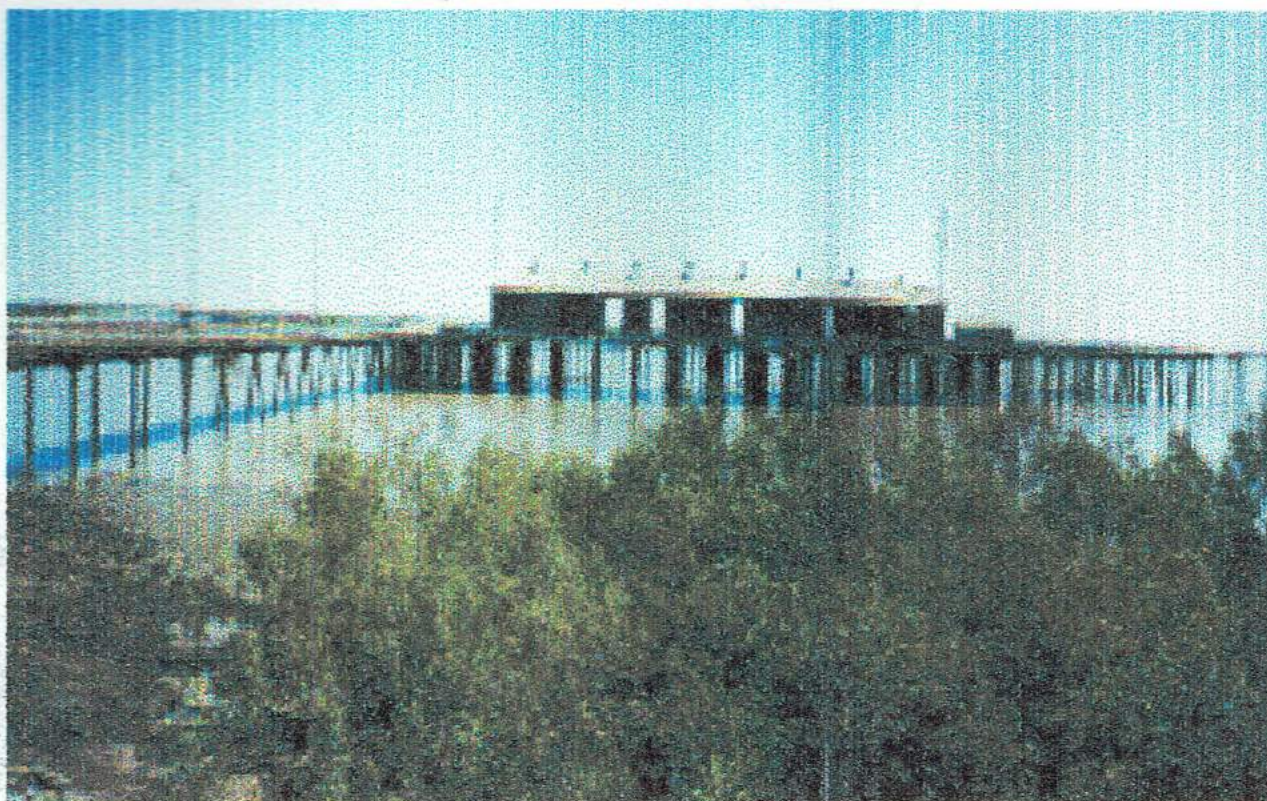




*The old **Carnarvon timber jetty** looking towards the head  
(above) and towards the shore (below)*







*Above – **Derby Jetty** taken from the shore showing the two necks connecting jetty head to the shore. The jetty was closed to shipping in 1980 due to the fall off of the live cattle trade. It was re opened in the mid 1990s as an ore loading facility. (taken 1994)*

*Below – The casting of the concrete deck, forming the roadway at the rear of the goods shed, The completed north neck is in the far background, Taken in 1964.*







*Above – The transit (goods) shed under construction on  
**Derby Jetty** 1964*

*Below - The Derby Jetty nearing completion taken in 1965  
at low tide, showing the goods shed framing and the erection  
of the 60 feet high light towers*







**Esperance Harbour** - No1 Berth with an overall length of 244m consisted of a 22.25 metre width reinforced concrete deck slab supported on tubular steel piles and carried a travelling ship loader owned and operated by Co-Operative Bulk Handling. The berth was designed to take a deck stack loading of 3,400 kg/ m<sup>2</sup> and a berthing load from a vessel of 30,000 tonnes loaded displacement mass with 50% of the kinetic energy being absorbed by the berth. Above is a general view of the berth and the photograph below taken of the end of the berth shows a typical type cross section of the structure.







**Geraldton Harbour** - No 1 Berth, 99m in length and No 2 berth, 203m in length comprise concrete cluster piles with cast insitu reinforced concrete transverse and longitudinal beams and light deck. The structure was designed initially for rail traffic and constructed in the 1930s. There was a 3000 m<sup>2</sup> cargo shed located immediately behind the No 1 berth. The depth of water at this berth was 8.8m at LWM. and at the No 2 berth it was 9.4m at LWM



**Geraldton Harbour** - No 3 Berth, 203m in length with a depth of water at the berth of 9.4m is of the same construction and age as No 1 and 2 Berths. Two grain bulk loading ship loaders each rated at 500tph were located at this berth.



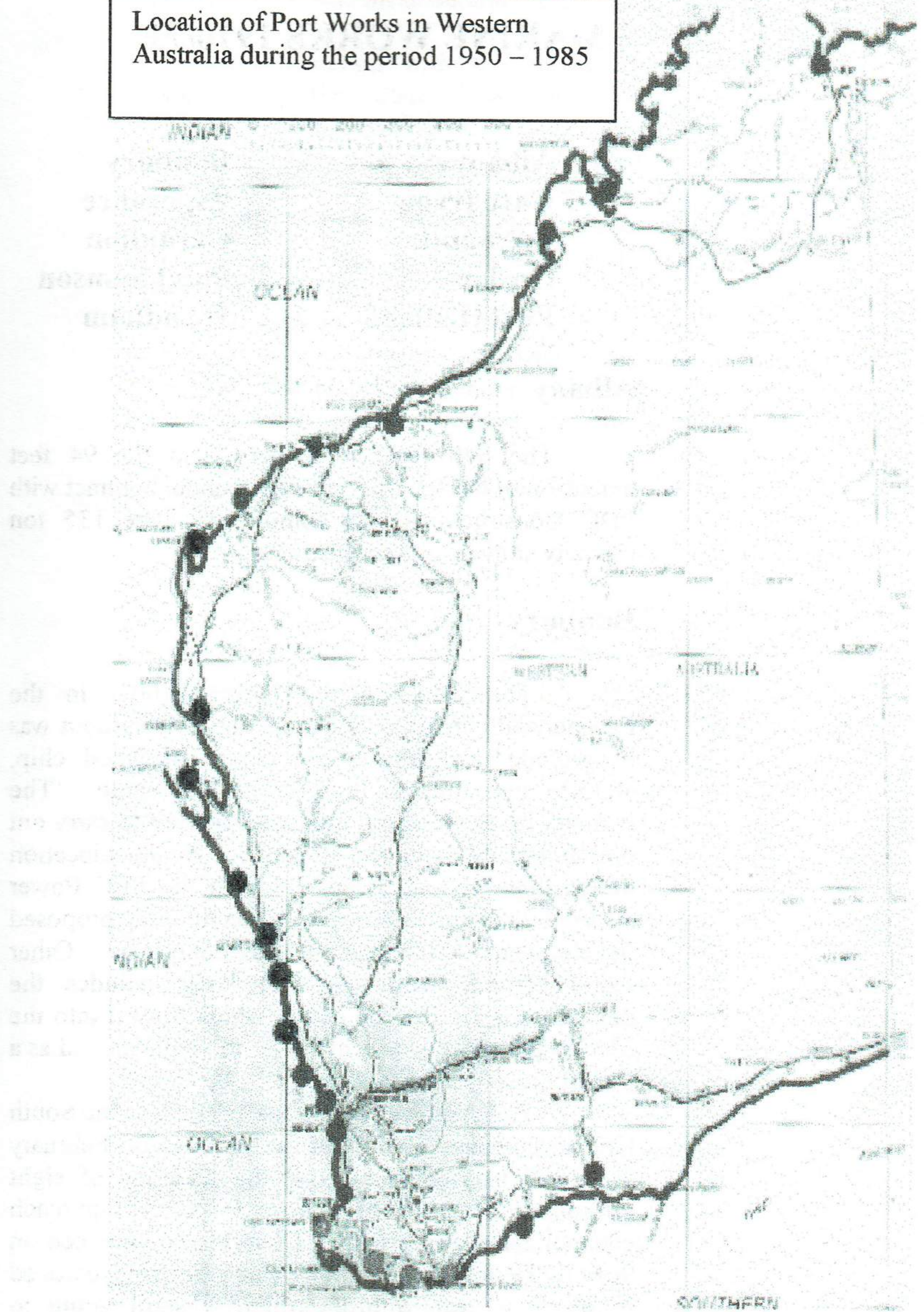


*The remains of the **Onslow Jetty** at Beadon Point. This Jetty was based on the design of the standard timber Jetty and had the same components, except that the timber was replaced with reinforced concrete. It was not successful and suffered severe damage from cyclones in the 50s and 60 s. It was then closed to shipping and a lighter operated between the shoreward end of the Jetty and the ship anchored off shore. Eventually the lighter operations were transferred from the Jetty to a lighter berth in Beadon Creek, a kilometre or so east of the town , and the Jetty was demolished by being blown up. Taken 3 July 1994*





Location of Port Works in Western  
Australia during the period 1950 – 1985





## **2 MARINE WORKS 1970/71**

**Albany  
Carnarvon  
Fremantle  
Onslow  
Port Hedland**

**Bunbury  
Esperance  
Geraldton  
Point Samson  
Wyndham**

### **Albany**

(?) The 640 feet No 3 berth and the 94 feet extension of No 1 Berth carried out under contract with PDC Constructions was completed. The 135 ton capacity slipway was reconstructed

### **Bunbury**

The work on the Inner Harbour in the Leschenault Estuary continued. The new harbour was to provide facilities for the export of wood chip, alumina and the handling of general cargo. The contract let to Dredging Industries in 1969 to carry out preliminary dredging and reclamation for the relocation of existing services associated with the SEC Power station on the north shore and adjacent to the proposed development of the harbour was completed. Other works carried out in the same year included the deviation of the Preston River, which flowed into the section of the Estuary, which was to be developed as a part of the new inner harbour.

A dredging contract was awarded to the South Korean company Hyundai Constructions on February 3rd 1970 for \$2,973,370 for the dredging of eight million cubic yards of material from the approach channel and harbour basin. Dredging commenced on 9th July 1970 with 2,300,000 cubic yds. being removed in the first year with the dredged spoil going to



reclamation for land areas behind the proposed harbour berths.

In conjunction with the above, the existing services for the State Electricity Commission, including new marshalling yards, water supply, roads and houses were relocated outside the harbour area.

The Western Australian Government Railways completed a direct rail link between Picton Junction and the new port area, including a rail bridge over the Preston River Diversion.

The new harbour was designed for ships up to 40,000 deadweight tonnes, with sites being provided adjacent to the harbour basin for the construction of berths initially for the export of alumina and woodchips.

The existing main lighthouse was relocated and extended.

## **Carnarvon**

Over this period the Carnarvon Jetty continued to be used by tankers for the import of petroleum products and it was being maintained for this purpose only.

## **Esperance**

The programme of port improvements to minimize delays to shipping, loading bulk cargoes of nickel, salt and wheat and the unloading of fertilizers, which was commenced the previous year continued.

Stabilization of the foreshore, reclaimed by dredging was completed and handed over to the Esperance Shire. A contract was let to Hunter and Lewis Pty Ltd for the construction of a 350 feet length rock groyne to protect the foreshore area in the vicinity of the western boundary of the Port Area.

The construction of a 750 feet length sheet pile wall behind the site of the second land backed berth was completed by the day labour organization of the Harbours and Rivers Branch of the Public Works Department.



Major rebuilding of the seaward end of the Tanker Jetty, damaged during the berthing of a tanker in March 1970 was completed. The end section of the disused old town Jetty was demolished.

A contract for the construction of a 700 feet length second land backed berth extending eastwards from the No 1 Berth and on the same alignment was awarded to John Holland Constructions Pty. Ltd. on November 19th 1970 for the sum of \$1,073,743 for completion in February 1972.

It was opened by Premier Tonkin on May 5 1972.

### **Fremantle**

Present capacity of approximately 300 fishing boats in the Fremantle Fishing Boat Harbour was increased by the provision of another 70 pens and the replacement of an existing public jetty commenced. A 286 feet length timber pile / concrete deck was completed in the Fishing Boat Harbour to service the Harbours and Rivers branch depot.

### **Geraldton**

Further drilling and blasting of the rock areas in the Geraldton harbour approach channel continued over this period. Between November 1970 and January 1971, 140,000 cubic yards of material was removed by the Westminster trailing suction hopper dredge WD 53.

The present capacity of the Geraldton Fishing Boat Harbour for 300 boats of, which 86 were moored in pens, was increased by 11 pens.

### **Onslow**

Port operations were moved from the jetty to a lighter berth established in Beadon Creek using the Lighter Ashburton. A goods yard was provided behind the new berth and a number of mooring piles were driven immediately upstream for small craft.



## **Point Samson**

The maintenance of the old timber jetty continued whilst consideration was being given to the replacement of the Jetty adjacent to the present one or else at Phillip Point near Dampier,

## **Port Hedland**

As an extension of the Utah dredging contract with Mount Newman Mining Company, the dredging of a further 347,00 cubic yards of material from the harbour for the site of the second land backed berth was completed, together reclaiming of eight acres of land and stockpiling for a further three acres at the second land backed berth site.

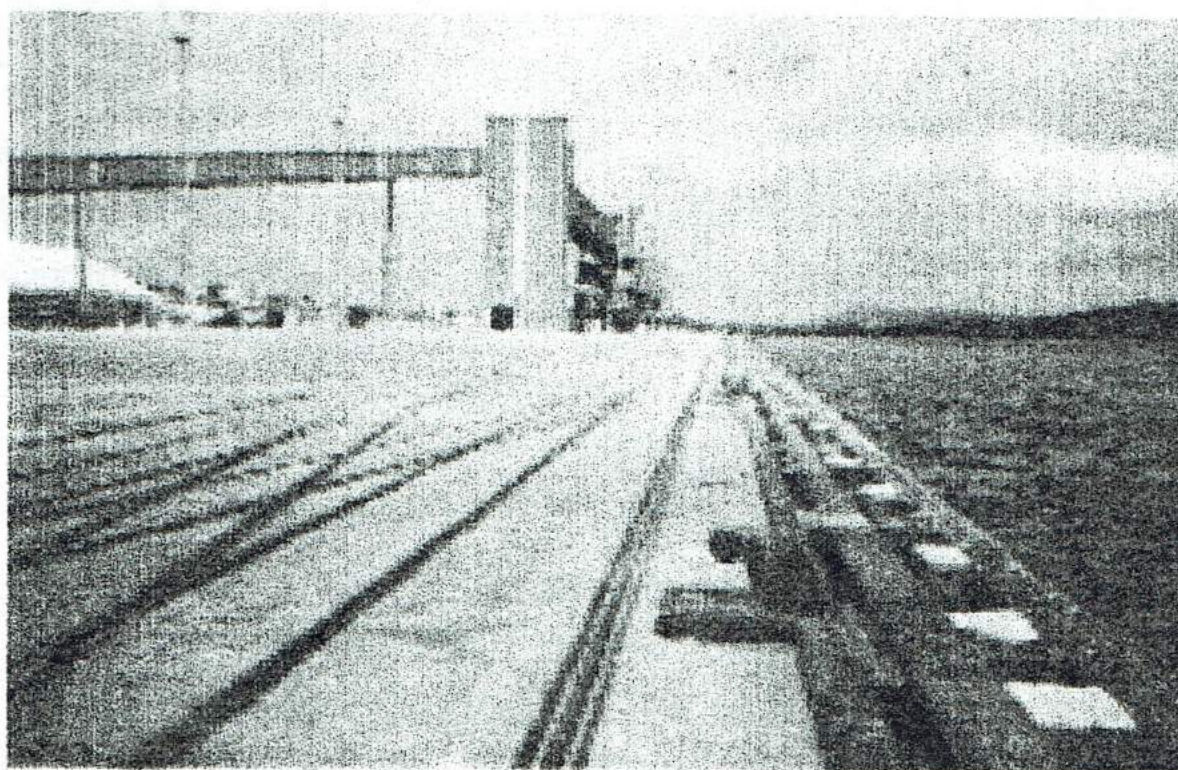
The building of a new air conditioned Waterside Workers' mess, ablution block and other amenities was completed. The deck of the first land backed berth, constructed initially for the handling of equipment for the Mount Newman Mining Company and the export of salt by the Leslie Salt Company was strengthened by the placing of additional underdeck beams.

## **Wyndham**

Dredging continued at the berths, removing silt, using the grab dredge "Fremantle". Three extra beacons were placed at Hare Channel in Cambridge Gulf and work commenced on a shore based container freezer installation. Plans also were prepared for a southern extension of the Jetty to accommodate longer length vessels.

Investigations proceeded for a new port site at Cape Domett, some 70 miles from Kununurra at the northern end of Cambridge Gulf.





**Albany Harbour** - Taken from the eastern end of No 1 Berth looking south east along No 2 berth to No 3 berth-The deck of No 1 and No 2 berths consisted of a thin reinforced concrete slab placed over longitudinal karri beams supported on karri cross girders. The super structure was supported on octagonal reinforced concrete piles. The concrete deck has a stack loading of 2,400 kgm/m<sup>2</sup> and the timber spring pile and timber fender system has been designed to take a berthing load of a 20,000 t displacement vessel with 50% of the kinetic energy being absorbed by the wharf structure. No 1 berth was 209m in length and the deepest permissible draft of vessels using this berth was 9.8m. This berth was used mainly for general and bulk cargoes. There was a transit shed of 4,300 m<sup>2</sup> of floor space immediately behind the berth. No 2 berth which had similar loading and draft limitations was used for general cargo and for the discharging of petroleum products, previously discharged over the "deep water Jetty"

The wharf structure of the No 3 berth consisted of a reinforced concrete slab deck supported on longitudinal steel beams. The longitudinal steel beams were supported on transverse steel cross girders fixed to steel tubular piles. The berth, which was 227m in length, was constructed in 1970 and was used for general bulk and grain loading.





**Bunbury Harbour** - A part of Koombana Bay showing the entrance to the lower Leschenault Inlet on the lower left and the entrance to the inner harbour in the centre of the photograph. The wood chip and mineral sands installation is right of the entrance and the alumina storage and loading area is to the left. The SEC power station is on the far left.



**Bunbury Harbour** - The rail access to the inner harbour over the bridge across the Preston River diversion -





***Esperance Harbour - No 2 Berth*** with an overall length of 213m consisted of a 23.16 m width reinforced concrete deck, designed for a stack loading of 3,400 kg/m<sup>2</sup>, supported on tubular steel piles. The berth carried a travelling shiploader with a fender system which had been designed to take vessels of up to 40,000 tonnes loaded displacement mass consisted of cylindrical rubber dock fender units supported by a deep reinforced concrete beam running the full length of the berth and being an integral part of the deck through which 50% of the berthing load was absorbed.





### **3 MARINE WORKS 1971/72**

#### **Albany Esperance**

#### **Bunbury Wyndham**

#### **Albany**

The old deepwater Jetty arm was closed and demolished and oil receivals were transferred to the west arm of the Jetty, Work commenced on a new 300 ton capacity slipway at Albany to ultimately replace the 135 ton capacity slipway. At this time the Public Works Department was operating slipways at Fremantle Harbour (No 1 -2,750 tons capacity and No2 - 600 tons capacity), one 80 ton capacity at Bunbury, one 10 ton capacity at Shark Bay and one 30 ton capacity at Geraldton.

#### **Bunbury**

Dredging of the new inner harbour at Bunbury continued and test drilling was carried out at the site of the proposed general cargo berth. A contract was let to A Firms and Company for the construction of a groyne and rock walling to stabilize the ocean entrance to the new harbour and a training groyne on the south side of the Leschenault Estuary Cut.

#### **Esperance**

The 700 feet length berth was completed by John Holland Constructions Pty, Ltd. in April 1972 and ancillary work as hardstanding, lighting etc. was completed in June 1972. The new berth was officially opened by the Hon. John Tonkin, Premier of Western Australia on May 5 1972.

The contract for a 350 feet long groyne, awarded to Hunter and Lewis was completed during the year. The replacement of fender piles in No 1

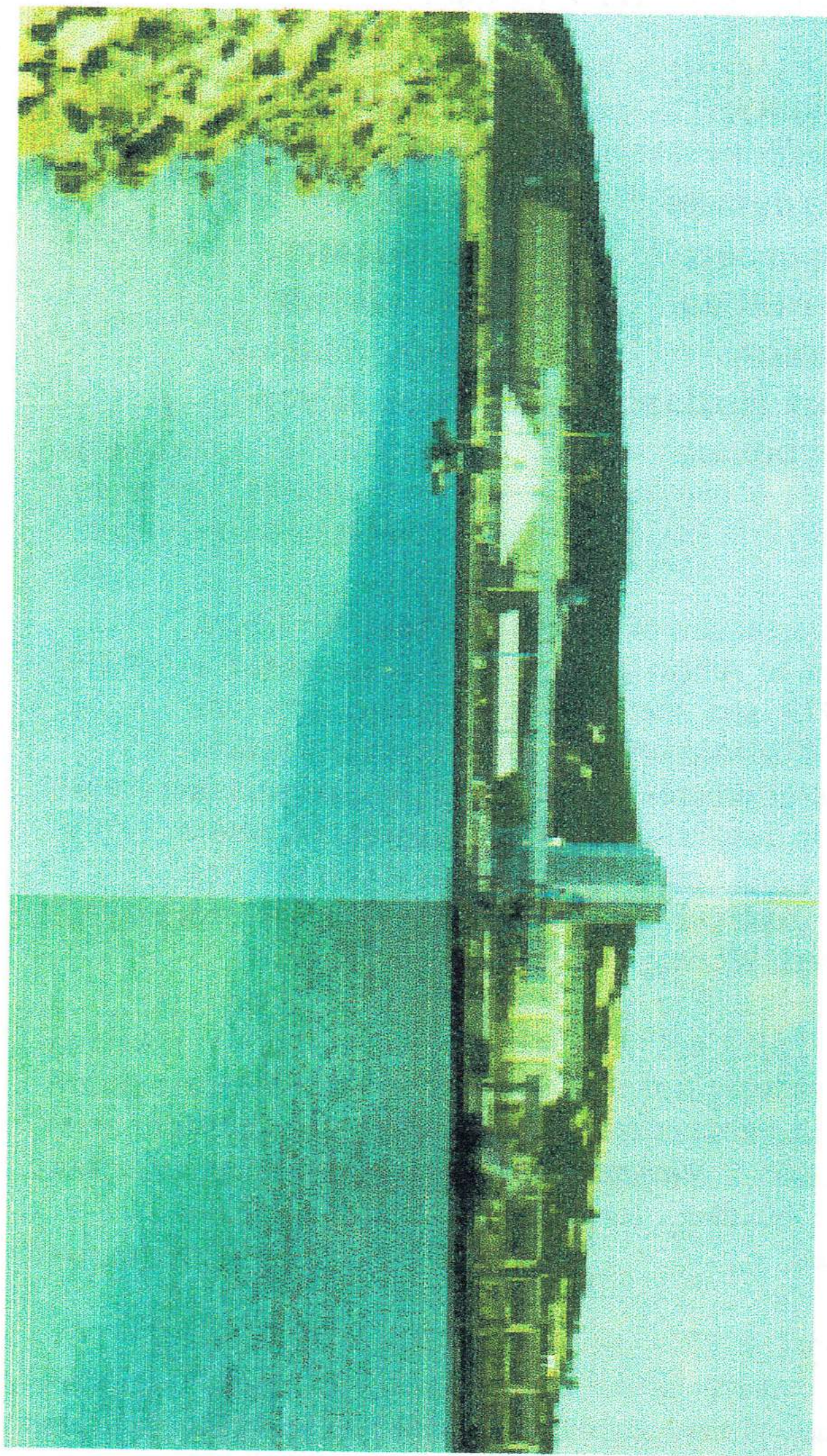


berth, which were badly attacked by marine borers, was commenced.

## **Wyndham**

The replacement of the badly deteriorated timber beams and timber decking in the Wyndham Jetty with steel beams and a reinforced concrete deck was commenced as a part of a major deck reconstruction programme. Existing Jetty sheds were cantilevered clear of the main deck to provide more deck space for rail sidings. The Dredge Fremantle carried out investigation work at Cape Domett..





**Esperance Harbour** taken from the inside of the breakwater at the entrance to the harbour. From left to right – part of the breakwater, No 2 berth and No 3 berth with bulk storages for grain and mineral ores in the background



## 4 MARINE WORKS 1972/73

**Albany**  
**Bunbury**  
**Carnarvon**  
**Esperance**  
**Geraldton**  
**Onslow**  
**Port Hedland**  
**Wyndham**

**Broome**  
**Busselton**  
**Derby**  
**Fremantle**  
**Mandurah**  
**Point Samson**  
**Swan River**

### **Albany**

An extension of 42 feet to Albany No 1 berth and 106 feet to Albany No 3 berth was completed in January 1973 and the old arm of the Jetty was removed. Construction of a new 300 ton capacity slipway was in progress. Two steel pile navigational beacons were installed on the Outer Approach Channel to replace the old timber structures and a new mooring was being replaced at Frenchman's Bay for the Cheynes Beach Whaling Company.

### **Broome**

Tenders were accepted for the provision of two freezers on the jetty. The construction of an amenities building for the Waterside Workers commenced,

### **Bunbury**

The dredging contractor, Hyundai Constructions completed the dredging of 5,810,000 cubic yards of the total of 8,200,000 cubic yards of material to be dredged from the new inner harbour at Bunbury. The disused old section of the Jetty inshore of the causeway in the outer harbour was demolished. A contract was let to R & H Kozyrski for the extension of four groynes in Koombana Bay.



## **Busselton**

The Busselton Jetty was closed to shipping as from September 1st 1972. Maintenance of the Jetty, now a non revenue producing facility, continued until March 1973 when it was handed over to the Shire of Busselton.

## **Carnarvan**

A contract was let to Toodyay Stone for the replacement of 960 feet of the old timber fascine wall with stone. Further repairs were carried out to the timber jetty for retaining the structure for tankers only.

## **Derby**

Further work was carried out in levelling of the sea bed to accommodate the new State Shipping Service vessels, when sitting on the bottom.

## **Esperance**

A contract was completed for a 210 feet extension of the foreshore training wall. No 1 Berth fender system was modified, and a 20 ton capacity small slipway and a launching ramp on the foreshore Just south of the existing town jetty were completed.

## **Fremantle**

A new public Jetty was constructed in the Fremantle Fishing Boat Harbour and the old concrete Jetty demolished. Construction of further pens and a small jetty for the Department of Fisheries and Fauna was completed.



## **Geraldton**

Drilling and blasting of the rock floor in the harbour to increase the depth of the basin and approach channel to 32 feet below low water continued. Further 16 boat pens were completed in the fishing boat harbour to provide pens for 110 vessels.

## **Mandurah**

Forty two Navigational Aids, including day markers and 8 navigational lights were installed in Peel Inlet and a 3 ton slipway was constructed at South Yunderup.

## **Onslow**

The lighter berth in Beadon Creek at Onslow was partly rebuilt in steel with new mooring piles and horizontal fenders.

## **Point Samson**

An amenities building was provided on the Point Samson Jetty and the power supply to the port area was upgraded.

## **Port Denison - Port for Dongara**

Investigations commenced at Leander Point, Port Denison in the building of a small boat harbour.

## **Port Hedland**

A contract awarded to Toodyay Stone for building a rock wall behind the site of the second Port Hedland land backed berth was completed in November 1972. A contract was awarded to Taylor Woodrow International to construct the second land backed berth, designated as No 1 berth. An agreement was also made with Mitsui and Company to dredge 5,600 cubic yards of material from the entrance and



the site of this berth, which was completed in June 1973.

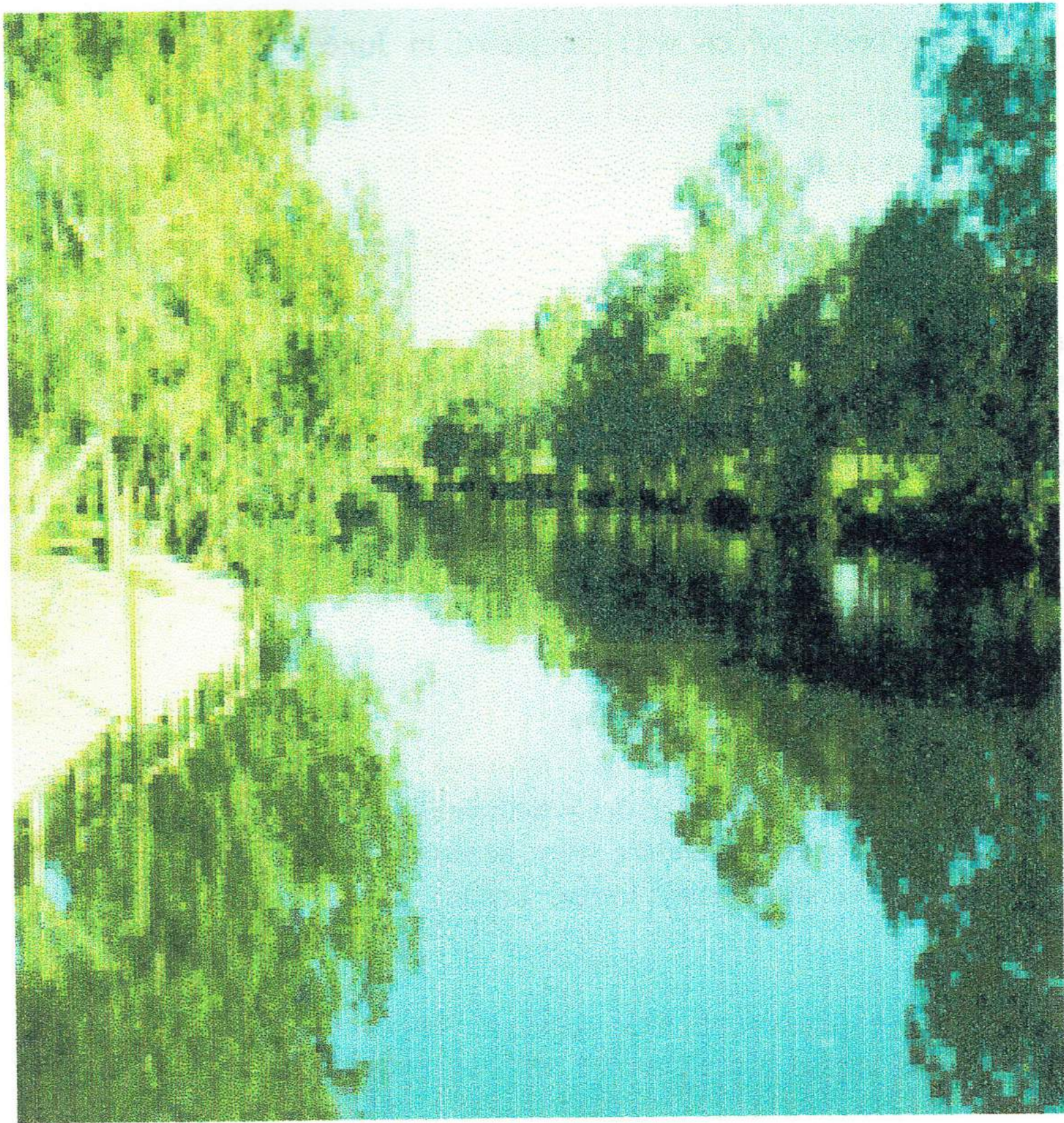
## **Swan River Berths and Jetties**

A Jetty was built for the Harbour and Light Department at Barrack Street together with the start of the building of a fifth Jetty at the Barrack Street Jetties complex. The fender system on the berth at the East Fremantle Ferry Terminal, East Street was strengthened to take the larger Rottuest Island ferries. A new slipway was constructed at the Harbours and Rivers depot at Ellam Street at Victoria Park and the construction of a new public launching ramp commenced at Point Walter.

## **Wyndham**

Replacement of the timber deck with reinforced concrete was in progress. Tenders were accepted for the installation of two shore based freezer units.





*Swan River Berths and Jetties* Apart from berth, Jetty and launching ramp construction, extensive foreshore works were carried out along the banks of the Swan River. A favoured foreshore treatment was the use of untreated jarrah logs with a water tight membrane between the sand fill and the back of the horizontally placed logs. Such a treatment is shown in the above photograph of a part of the Swan River in the Bassendean area.



## **5 MARINE WORKS in 1973/74 and 1974/75**

**Albany  
Bunbury  
Derby  
Geraldton  
Port Hedland  
Wyndham**

**Broome  
Carnarvon  
Esperance  
Port Samson  
Swan River**

### **Albany**

The construction of a new 300 ton capacity slipway with the provision for upgrading up to 600 ton was near completion and a mooring structure and service building for Harbour and Light Department was built at the town jetty. The old slipway on the deepwater Jetty was demolished.

### **Broome**

An amenities building on the Broome Jetty was provided. A contract was completed by Freighter Industries for the installation of two freezer units for handling perishable cargo on the Jetty. An extension of the existing cargo shed on the Jetty to provide additional offices for the Harbour and Light Department was completed..

### **Bunbury**

The dredging of the new inner harbour was 90% completed by the middle of 1974, Tenders were called for the removal of 208,000 cubic yards of rock material within the approach channel and the turning basin. A new opening was commenced from the lower Leschenault Inlet into Koombana Bay for small craft. The Inlet or part thereof now had three openings to the ocean, the first north of Turkey Point, the second at the new inner harbour and the third near the original



opening of the Inlet. Ground investigations were completed at the sites of No 1 and No 2 inner harbour berths.

Due to the inability of Hyundai Dredging to complete its contract, after carrying out 94% of the work, the Company was released from its contract, the work being taken over by Australian Dredging and General Works. Another contract was awarded to Australian Dredging and General Works for the removal of approximately 331,000 cubic metres of rock from the approach channel and turning basin.

The construction by the Harbours and Rivers day labour organization of the Inner Harbour No I (Woodchip) berth was 65% completed. The dredging of the lower Leschenault Inlet channel together with the construction of a new rail bridge over the channel was completed. The concrete sleeving of the piles on the La Porte effluent structure and on the Fishermen's jetty in the outer harbour was completed.

## **Carnarvon**

The renewal of 960 feet of the Carnarvon fascine wall in the south arm of the Gascoyne River was completed.

Dredging Industries removed 400,000 cubic yards of material from Teggs Channel and the approach channel and basin of the new fishing boat harbour at Pickles Point.

## **Derby**

A chiller and freezer unit was installed in the jetty transit shed for handling perishable cargo.

## **Esperance**

Due to the inability of Franco Constructions to complete their contract for the extension of the existing breakwater by 650 feet, tenders were recalled, the tender being awarded to A Firms, who completed the work that year.



## **Geraldton**

Westham Dredging Company's trailer dredge WDA Endeavour was engaged for removing material from the harbour bed.

## **Point Samson**

With the development of the iron ore export port at Cape Lambert, cargo handling was eventually transferred from Point Samson to private facilities at Cape Lambert, and Point Samson Jetty was closed to commercial shipping.

## **Port Hedland**

Construction of the second land backed berth by Taylor Woodrow was near completion. A contract was awarded to Westham Dredging for the maintenance dredging of the harbour basin and part of the approach channel.

## **Swan River Berths and Jetties**

Construction of Barrack Street No 5 jetty was proceeding together with a sewerage pumping station to service vessels using the Jetty complex. Work commenced on the replacement of the Mend-Street Jetty in South Perth and the timber foreshore wall between Ellam and Coode Streets in South Perth.

A new launching ramp was completed at Point Walter and work commenced on a launching ramp complex at Preston Point, East Fremantle.

## **Wyndham**

Replacement of the timber, deck of the Jetty with reinforced concrete in the south berth was completed. An extension of the south berth by 72 feet to take a travelling ship loader for the bulk loading of grains from Kununurra was commenced



## **6 MARINE WORKS in 1975/76 and 1976/77**

**Albany  
Wyndham**

**Broome**

### **Albany**

The 300 ton slipway was completed in this period and investigations into a proposed fishing boat harbour were commenced and planning was progressed for the deepening of the harbour.

### **Broome**

The 30 tonne capacity slipway cradle near the Entrance Point Jetty was rebuilt and the replacement of some of the outer berth fender units commenced.

### **Wyndham**

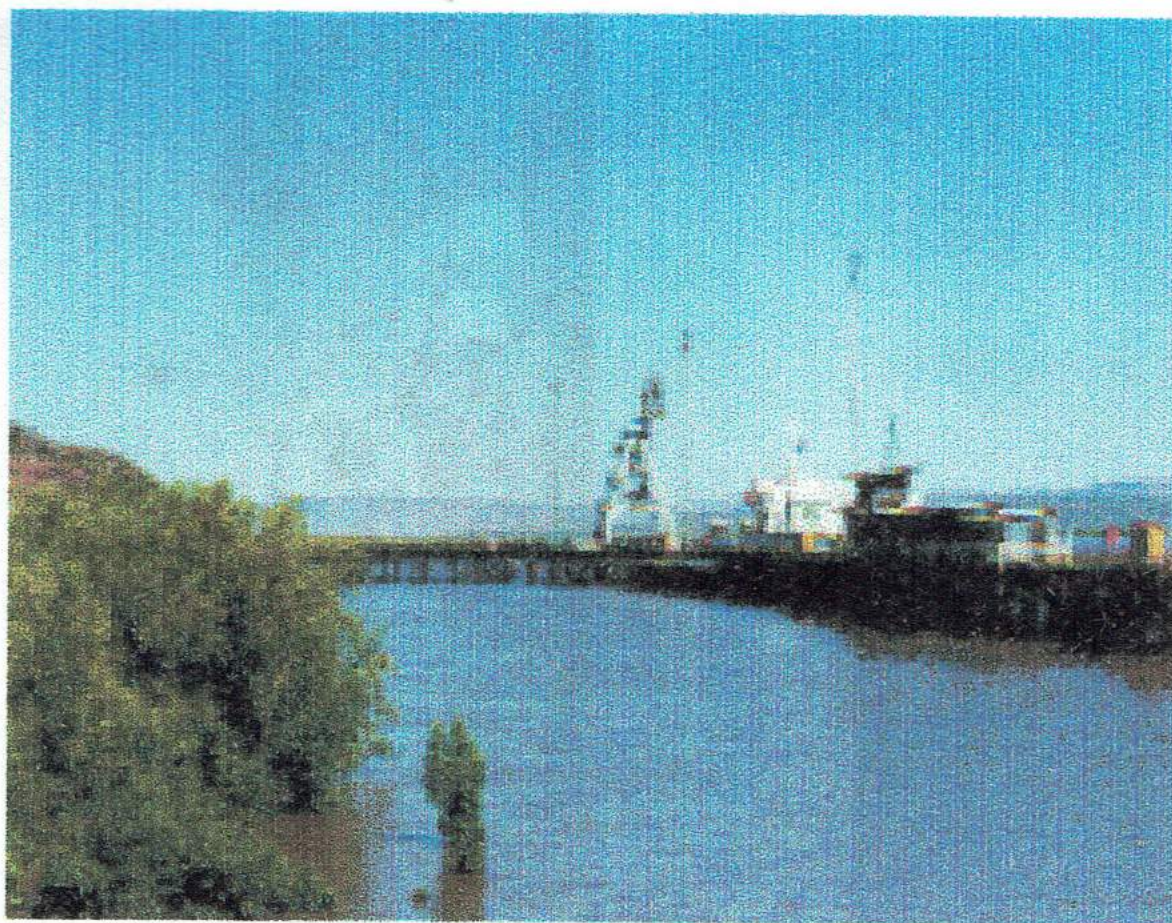
A travelling shiploader was installed on the Jetty.





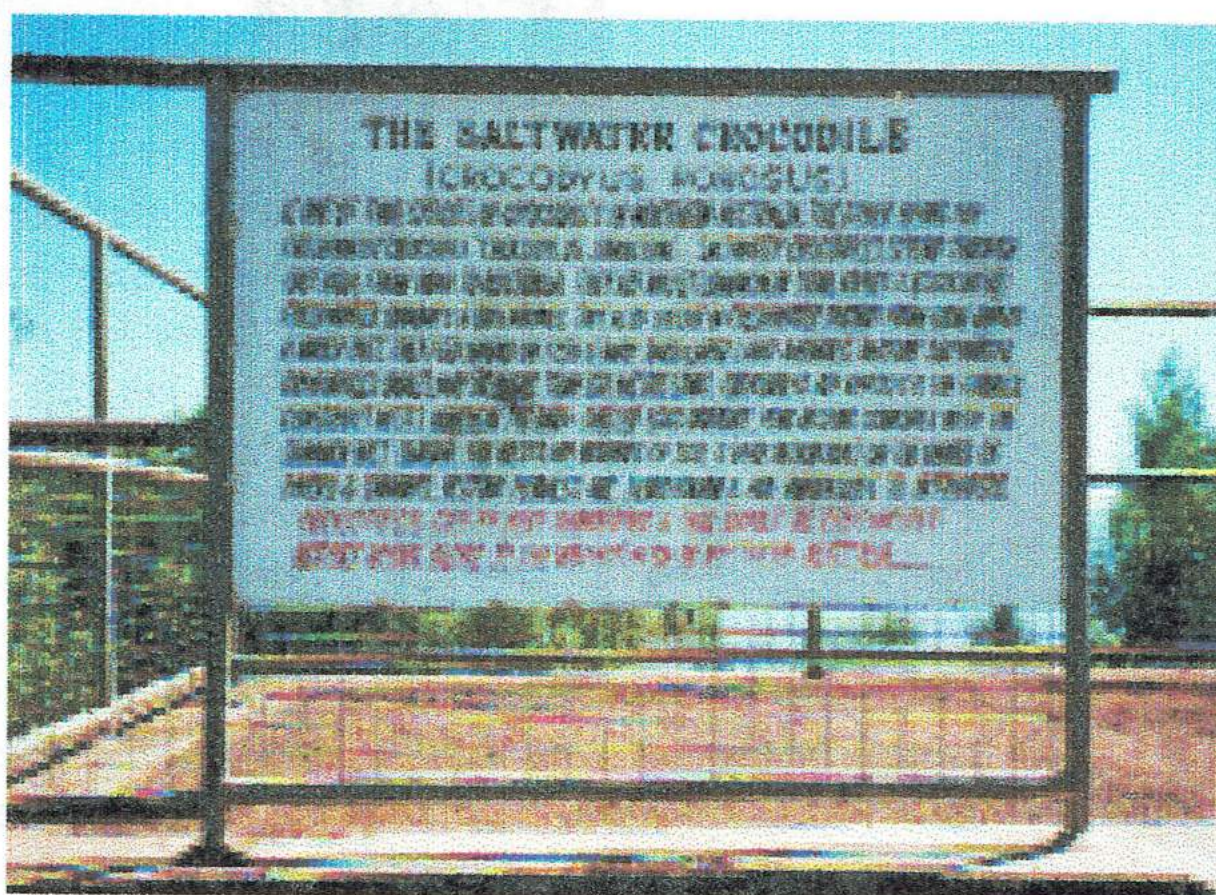
***Port Hedland*** taken from near the top of the Lookout Tower in Wedge Street, looking south west over the town and the port area. From left to right the - Salt Stockpile behind the No 3 Berth, the iron ore loader at the end of the Mount Newman's berths, the Port Control Tower, the commercial berths, the tug harbour and on the far right a part of the Goldsworthy iron ore operations on Finnucane Island. The street in the foreground is Wedge Street , the main commercial centre of Port Hedland. The other commercial centre is at South Hedland located some 16 kilometres inland from Port. Taken 28 -June 1994





Above - **Wyndham Jetty** looking from shore with the ship-loader parked at the southern end of the berth,

Below -An enclosed crocodile lookout on the Cambridge Gulf foreshore, which was located in the area where the blood drain from the Wyndham Meatworks entered the Gulf





## **7 MARINE WORKS in 1977/78, 1978/79 and 1979/80**

<b>Albany</b>	<b>Broome</b>
<b>Bunbury</b>	<b>Busselton</b>
<b>Carnarvon</b>	<b>Cervantes</b>
<b>Denham</b>	<b>Esperance</b>
<b>Esperance FBH</b>	<b>Fremantle</b>
<b>Geraldton</b>	<b>Jurien Bay</b>
<b>Ocean Reef</b>	<b>Onslow</b>
<b>Port Denison</b>	<b>Port Gregory</b>
<b>Swan River</b>	<b>Wyndham</b>

### **Albany**

The dredging and reclamation works associated with the deepening of the harbour to 12.2 metres were completed in 1979 with the removal of 1.25 million cub.metres of sand and 21,000 cubic metres of rock from the harbour basin. New oil bunkering facilities were completed.

In 1979/80 a Contract was awarded for grab dredging at the face of No 1 and 2 berths. A contract for the construction of an underwater sheet pile wall at No 3 berth together with the installation of rubber fender units at No 3 berth was completed. New navigational aids were installed in the harbour.

Bulk loading equipment at No 3 berth owned and operated by CBH (Cooperative Bulk Handling) can load vessels at the rate 1600 tonnes per hour. The three berths form a continuous face of 508m. The No 3 berth fender system was upgraded in 1979 and comprises Bridgestone cell type rubber fender units mounted on precast concrete blocks and fixed to the face of the existing structure.

This allows for the berthing of vessels of up to 60,000 tones loaded displacement with 50% of the kinetic energy of berthing loads being absorbed by the



structure. The permissible draft of vessels using this berth was 11.5m.)

### **Albany Fishing Industry Facilities**

A new jetty for the fishing industry was built at Emu Point in 1978/79. Provision for facilities for large trawlers was being investigated.

### **Broome**

A feasibility study was carried out for the installation of bulk loading facilities on Broome Jetty.

### **Bunbury**

Construction of No 2 inner harbour berth was completed and new precast concrete fender brackets were fixed to No 1 outer harbour berth. Construction of a storm surge barrier in the estuary to minimize flooding of low lying areas of Bunbury was completed.

### **Busselton**

The pedestrian promenade on the jetty was destroyed by cyclone "Alby" in April 1978 and access was transferred to the railway viaduct.

### **Carnarvon**

The timber Jetty was extensively damaged by cyclone "Hazel" and temporary walkways were built over parts of the Jetty to enable oil receivals to proceed.

The dredging of the Carnarvon Fishing Boat Harbour was completed and a new 100 tonne capacity slipway, constructed in the harbour was opened by the Minister for Works on 3 November 1978. Investigations for a low level landing for vessels was commenced and a second 100 tonne capacity cradle with transverse was also provided.



## **Cervantes**

Leading beacons were installed in 1978

## **Denham**

The repairs to a damaged section of Jetty caused by cyclone "Hazel" was carried out and the Jetty length reduced in length. A 600 metre length channel was dredged to the new head,

Dredging of an approach channel and inshore basin was progressing and, the construction of a slipway /launching ramp was commenced

## **Esperance**

A dredge was built for the Esperance Port Authority.

## **Esperance Fishing Boat Harbour**

A site at the mouth of Bandy Greek was selected for the new fishing boat harbour and a landing on the Taylor Street Jetty in Esperance was completed.

## **Fremantle**

The construction of breakwaters for Fremantle Sailing Club was carried out and a new jetty for the Department of Fisheries was completed.

## **Geraldton**

The construction of No 5 land backed berth was completed and opened by the Premier, Hon Sir Charles Court on April 6 1979. In 1979 five Sarus Towers and four piled navigational aids defining the approach channel were completed.

## **Jurien Bay**

Navigational lights were upgraded in 1979/80



## **Ocean Reef**

Two breakwaters to provide sheltered water for an ocean boat launching facility at Ocean Reef together with navigational aids, a mooring Jetty and launching ramps were constructed

## **Onslow**

After the closing of Onslow as a commercial port,, the lighter berth in Beadon Creek was converted to a general purpose berth for the fishing and oil activities.

## **Port Denison Fishing Boat Harbour**

The construction of a fishing boat harbour at Leander Point Port Denison was commenced with the building of two breakwaters giving a total protective water area of 28 ha was completed in March 1979. The harbour was opened by the Hon Minister for Works in June 1979. The construction of a heavy load capacity Jetty in the harbour and new navigational aids was proceeding..

## **Port Gregory**

A new Jetty was constructed in 1979/80

## **Swan River Berths and Jetties**

In 1979 No 3 Jetty at Barrack Street was completed and a vacuum sewerage system installed on all Jetties. A Jetty was constructed at Tranby House for the National Trust and a heavy lift Jetty was completed at East Street at East Fremantle.

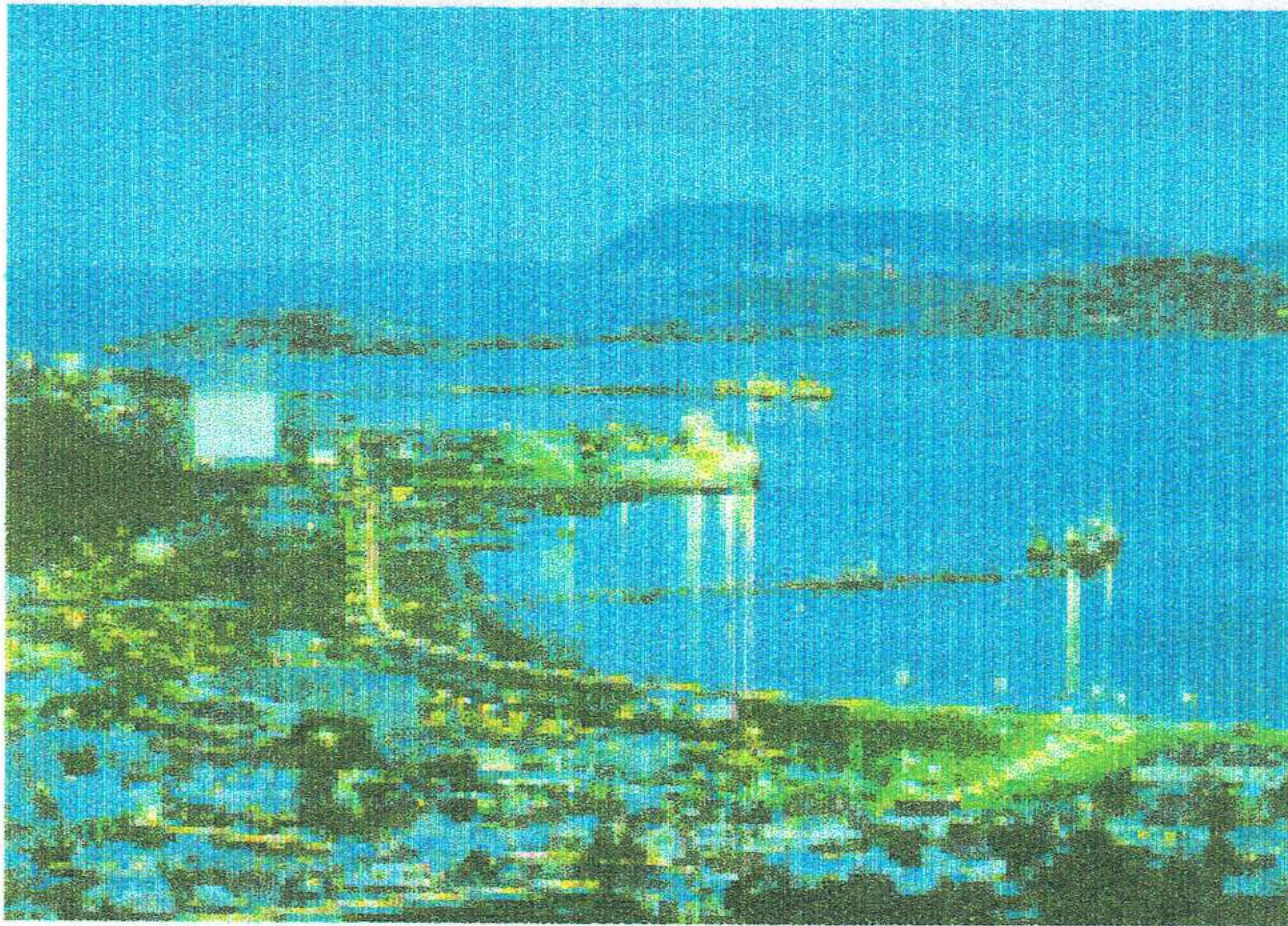
## **Wyndham**

The upgrading of the fender system on the Jetty, a short extension of the Jetty southwards and the



replacement the timber decks in both the approach necks with concrete were completed.

A bitumenised container park was provided in the Wyndham Goods Yard and five new navigational markers were positioned in the outer channel.



**Albany Harbour** *An overall night view of the port of Albany located in Princess Royal Harbour,. The Jetty in the foreground was known as the Town Jetty. Beyond that was the slipway with the land backed berths situated off reclaimed land projecting out into the harbour, Just inside the harbour entrance at the top left was the tanker Jetty.*





**Bunbury Harbour** - The inner harbour No 1 woodchips dolphin type berth with an overall length of 381m. The fender system consists of Bridgestone Cell Dock Rubber units providing for a berthing load of a vessel with 45,000 tonnes displacement. The fixed ship loader was rated at 1000 t /h.



**Bunbury Harbour** - The inner harbour No 2 berth and No 1 berth, looking towards the harbour entrance. The No 2 berth is 240m in length with a 22.5 m apron and was designed for a stack load of 4,400 kg/m<sup>2</sup> and a berthing load of a vessel of 68,000 tonnes displacement using Seibu V type rubber fenders.





*Carnarvon Fishing Boat Harbour at  
Mangrove Point, Douglas Street*







**Esperance Harbour** - Dredge "Esperance" designed by Consultant Keith Dodd and built by Crewe and Sons of Perth on behalf of the PWD for the Esperance Port Authority.



**Esperance Harbour** --taken from Dempster Head, showing a ship loading grain at No 1 Berth





**Geraldton Harbour** - No 4 Berth, constructed in 1964 comprises steel tubular piles, transverse and longitudinal steel beams and reinforced concrete deck. The berth was extended in 1987 by 100m to give an overall length of 281m. The berth has bulk loading equipment for the export of mineral products with a travelling shiploader rated at 1000tph. Depth of water at the berth was 9.4m at LWM..



**Geraldton Harbour** - No 5 Berth, which was constructed in 1978, comprises steel tubular piles, which are partly concrete sleeved, and a heavy reinforced concrete deck. The berth was 213m long and has a depth of water of 9.4m at LWM,- The berth was designed to take a travelling ship loader, The Seibu rubber dock units on the fender system were designed to take a berthing load from a vessel of 27,000 tonnes loaded displacement.





### **Onslow**

*The town of Onslow is a survivor. Several times it has been blasted by severe cyclones. It was bombed by Japanese aircraft in 1943 and it was badly shaken by the British atomic bomb tests on the Monte Bello Islands in 1952. It has now become the supply base for the Saladin oil fields and Barrow Island and is also an important base for the fishing industry, now centred around the original lighter berth constructed in Beadon Creek, as shown on these photographs.*





## **8 MARINE WORKS in 1980/81 and 1981/82**

<b>Albany</b>	<b>Broome</b>
<b>Bunbury</b>	<b>Carnarvon</b>
<b>Denham</b>	<b>Esperance</b>
<b>Esperance FBH</b>	<b>Geraldton</b>
<b>Greenhead</b>	<b>Point Samson</b>
<b>Port Denison</b>	<b>Wyndham</b>

### **Albany**

Two navigational aids were installed in the outer harbour and a can buoy installed in King George Sound.

Tenders were called for the design and construction of a white oil products line to No 1 and No 2 berths.

### **Broome**

A bulk loading installation, comprising a 16,000 tonnes capacity grain storage shed on shore, a weighbridge and a 300 tph transportable jetty ship loader were completed.

### **Bunbury**

Electrical installation on the inner harbour berth No 2 was completed. Improvements to the power supply to the outer harbour were carried out for the Go-Operative Bulk Handling ship loader at the breakwater berths and for the upgrading of the mineral sands storage facilities.



## **Carnarvon Fishing Boat Harbour**

Maintenance dredging of Teggs Channel and the approach channel to the fishing boat harbour and the berthing area at the ocean jetty was carried out.

A low level fish landing was constructed off the service Jetty and some minor improvements were carried out to the slipway.

## **Denham**

Dredging proceeded on the inshore basin and the approach channel and the construction of a slipway/launching ramp was completed.

## **Esperance**

Relocation of the entrance channel navigational aids was completed. The progressive replacement of piles in the tanker Jetty, in order to retain the structure as a promenade Jetty continued with the cost being shared between the Public Works Department and the Esperance Shire Council proceeded.

## **Esperance Fishing Boat Facilities**

The access road to the site of the Bandy Creek Boat Harbour and a bridge over Bandy Creek were constructed. An electric hoist was installed at the Taylor Street landing in Esperance.

## **Geraldton**

A heavy duty lift slab on Nol berth, a Jetty for the Harbour and Light Department and the strengthening of the No 3 berth were completed. The upgrading of the fender system on No4 berth was completed and the five Sarus Towers, defining the entrance channel were removed to shore, repainted and reinstalled.



## **Greenhead**

A Jetty for the fishing industry was completed.

## **Point Samson**

Dredging of new fishing boat harbour at Johns Creek. in progress

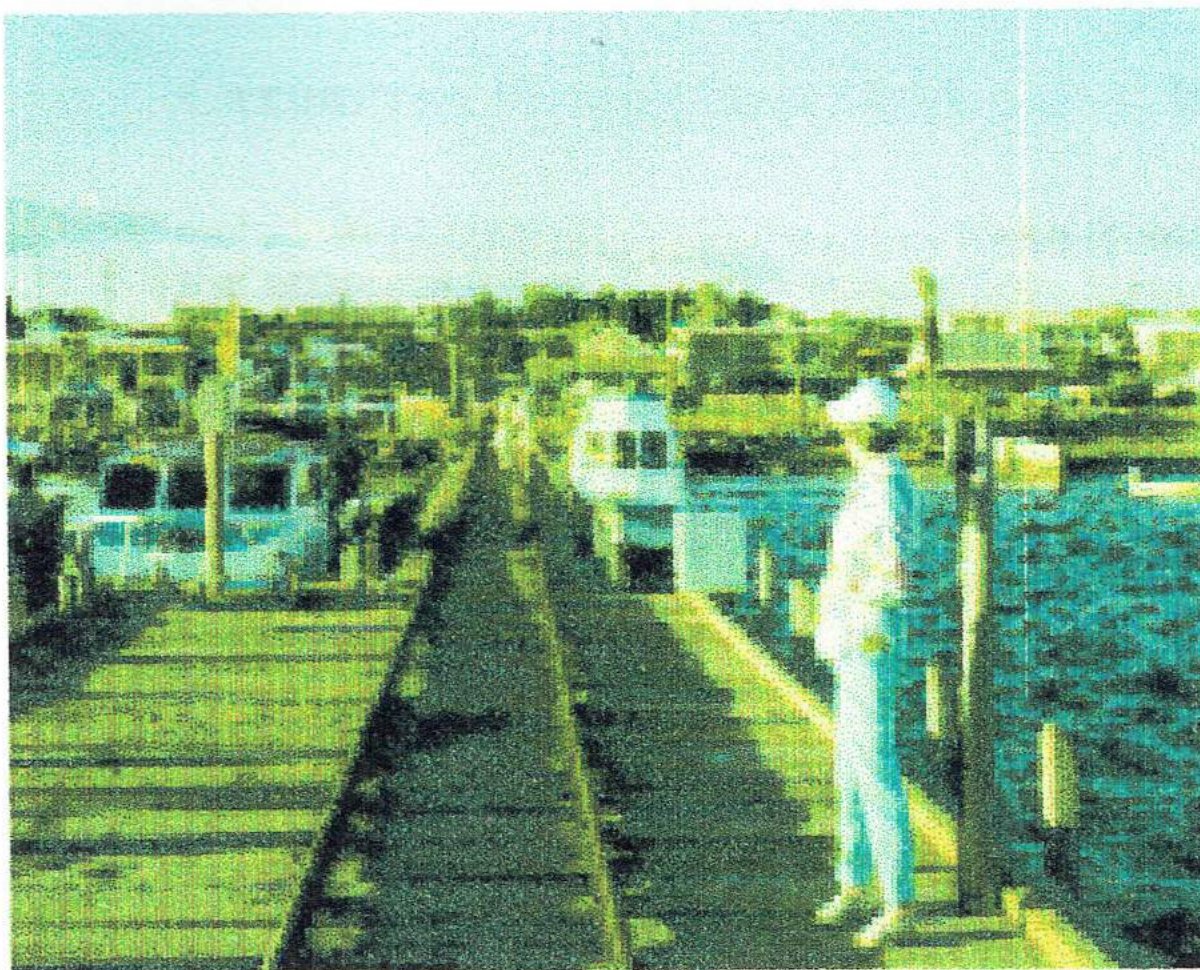
## **Port Denison**

A new service Jetty and dinghy floating pontoons were provided and the approach road and service area was sealed..

## **Wyndham**

A concrete pad was provided in the container yard for washing down containers and a 20 metre extension to the park was sealed. The Jetty fender system was extended a further 5 m southwards.





*Denham Jetty after reconstruction with new boat mooring and launching facilities on the left.*



*Carnarvon Fishing Boat Harbour at Mangrove Point. taken from the service jetty looking down the approach channel which connected with Teggs Channel, a natural channel leading into deeper water south of the old jetty.- taken 3 July 1994*





*Esperance Harbour, showing the main breakwater off from Dempster Head in the centre of the photograph and the harbour berths within the protected water area. The town of Esperance is in the foreground*



*Esperance Fishing boat harbour at Bandy Creek, east of the town of Esperance, showing the commercial development along the eastern side of the mooring basin.*



## **9 MARINE WORKS 1982/83, 1983/84 and 1984/85**

<b>Albany</b>	<b>Augusta</b>
<b>Broome</b>	<b>Bunbury</b>
<b>Denham</b>	<b>Derby</b>
<b>Esperance FBH</b>	<b>Fremantle</b>
<b>Geraldton</b>	<b>Hopetoun</b>
<b>Jervoise Bay</b>	<b>Jurien Bay</b>
<b>Point Samson</b>	<b>Wyndham</b>

### **Albany**

A new white oil pipeline was constructed to No 1 and 2 berths to replace the existing oil line on the deepwater Jetty. Navigation beacons marking the inner basin were provided and a sector light marking the outer approaches to the harbour was installed.

A new tug berth was constructed at the old town Jetty and a low level landing was constructed at the service Jetty at Emu Point. Modifications were carried out to the 320 tonne slipway.

### **Augusta**

A new fishermen's service jetty in Hardy Inlet at the end of Ellis Street was completed and opened on 15 Nov 1984 by the Hon Minister for Works.

### **Broome**

Major reconstruction of the outer berth fender system was completed and drainage and roadworks at the bulk storage facilities were carried out in 1983.



## **Bunbury**

Modifications were made to the channel navigational aids and the main breakwater was extended by 70 metres

Reclamation for a hard standing area near the breakwater for commercial fishing was carried out and a fishing boat service jetty was completed.

## **Denham**

Reclaimed land behind the harbour was sealed and water and electricity services connected to the slipway and Jetty.

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## **Derby**

The seaward approaches to the jetty were resurveyed and investigations carried out as to the feasibility of deepening the port. Due to navigational problems in the approach to the Jetty, the port was eventually closed.

## **Eperance Fishing Boat Harbour**

The breakwaters at the entrance to the Bandy Greek Boat Harbour were completed. The main harbour basin was excavated by land based plant using dewatering techniques. The entrance to the harbour was dredged by conventional dredging. A new boat launching ramp, land backed wharf and boat pens were completed.

## **Fremantle**

An 85 metre length of mooring catwalk with 33 pens was completed in the southern part of the Fremantle Fishing Boat Harbour and a 60 metre long wharf at Mews Road and a 84 metre length land backed berth in the northern section of the harbour were constructed. Provision of facilities for the holding of the Americas Cup commenced with the



construction of breakwaters and land reclamation. Ultimately there were 3 enclosed boat harbours used for accommodating syndicates competing in the Race. They were Success Harbour controlled by the Fremantle Sailing Club, the Fremantle Fishing Boat Harbour and the newly constructed Challenger Harbour located in an area between the fishing boat harbour and the south mole of Fremantle Harbour. Both of these harbours came under the control of the Department of Marine and Harbours, previously the Harbour and Light Department.

## **Geraldton**

The grab dredging of shoal areas in the inner approach channel was carried out. Several modules for the platform for the Rankin "A" gas pipeline for the North West Gas Shelf project were shipped out of Geraldton over the No 5 berth.

## **Hopetoun**

The construction of a new fishing boat harbour facility at Hopetoun was completed including a breakwater with reclaimed hardstanding and service areas, a boat landing and a boat ramp.

The remaining part of the old timber Jetty was removed.

## **Jervoise Bay**

A precast concrete slab steel pile type skirt breakwater was built at Jervoise Bay to provide a protective water area for recreational craft but still allowing for water circulation to meet environmental requirements. This structure, being partly of an experimental type eventually failed as a result of unpredicted sea action and was eventually replaced with a conventional rock fill breakwater



## **Jurien Bay**

The construction of a land locked boat harbour similar to that recently built at Esperance was commenced, comprising two breakwaters of a total length of 580 metres and the excavation of, 915,000 cubic metres of material from the inshore mooring and service basin, together with the provision of pens, a service Jetty and launching ramps. It was completed in the following two years.

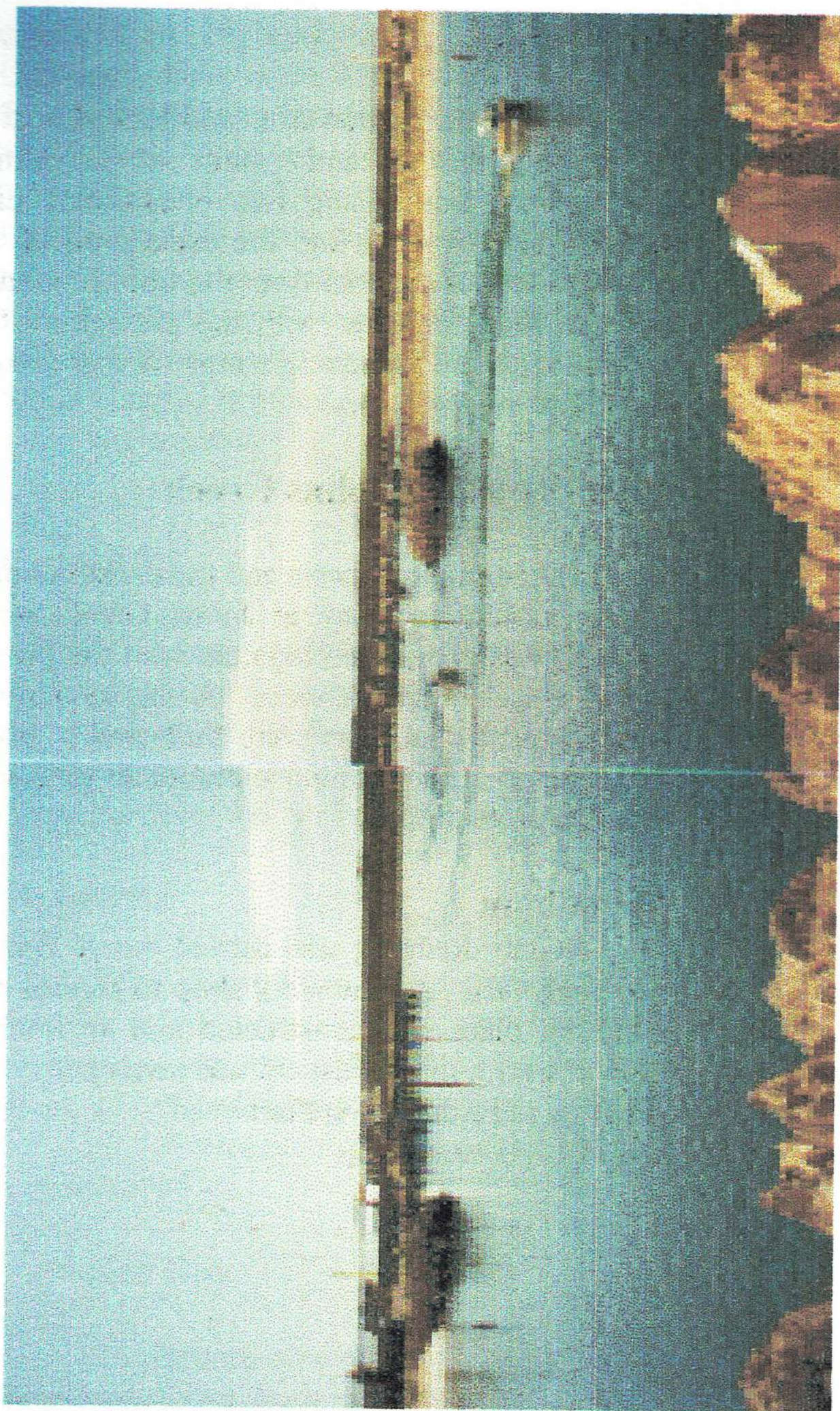
## **Point Samson - Johns Creek**

Dredging of a basin and the construction of a 40 tonne capacity slipway at Johns Creek, near point Samson was completed together with the provision of water and electrical services. A service Jetty and the first stage of boat pens were built and a groyne was constructed at the harbour entrance to give additional cyclone protection.

## **Wyndham**

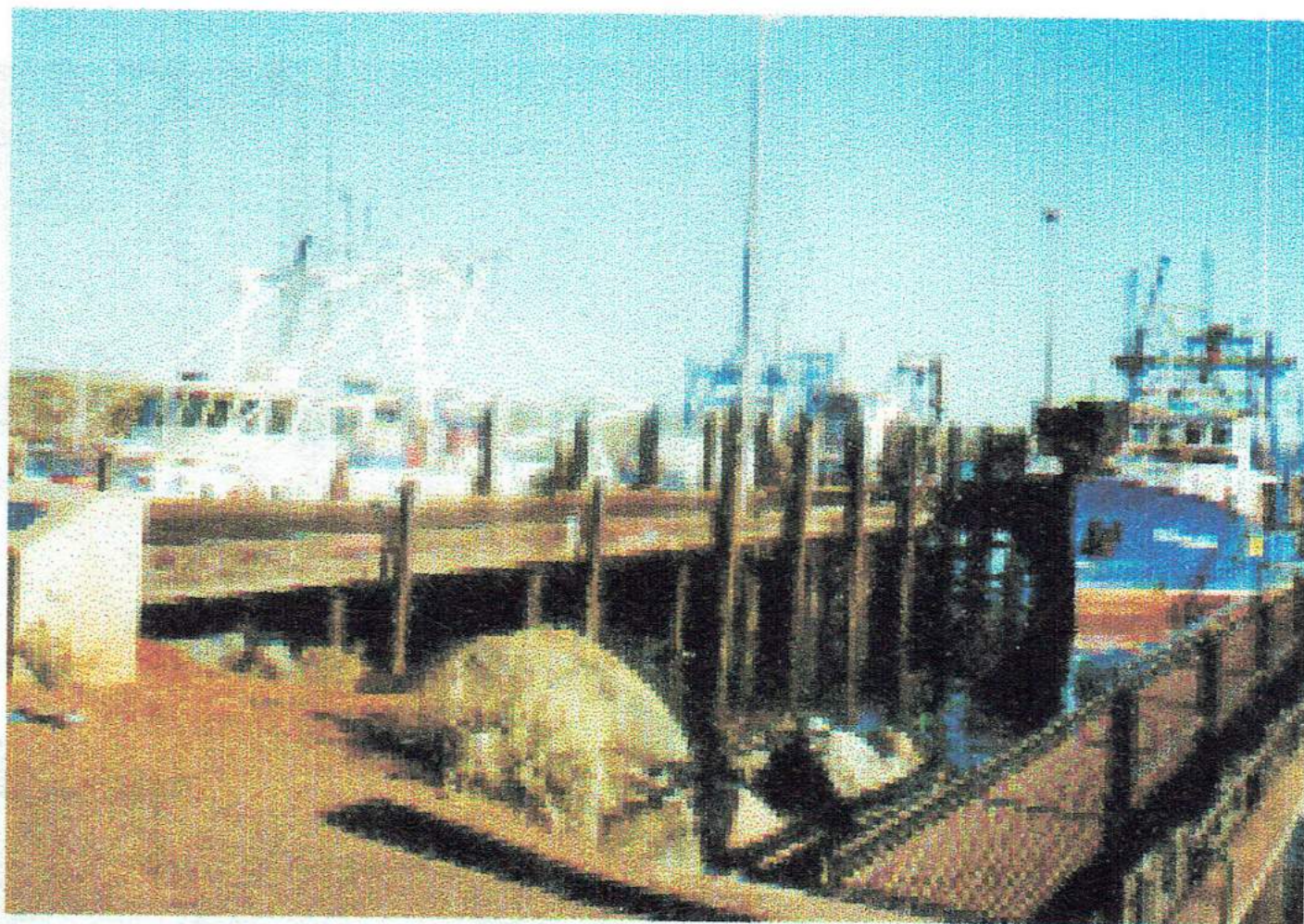
Grab dredging was carried out at Wyndham at the berth face. A new work shop to service container handling plant was constructed and an internal road system within the goodsyard was revamped. Existing rail sidings were removed.





*Jurien Bay -30th September 1989 - Jurien Bay boat harbour showing main harbour basin viewed from northern breakwater. Facilities for fishing boats are located on the LHS of the harbour whilst recreational boating is catered for at the shoreward end of the harbour to the RHS of the photograph.*

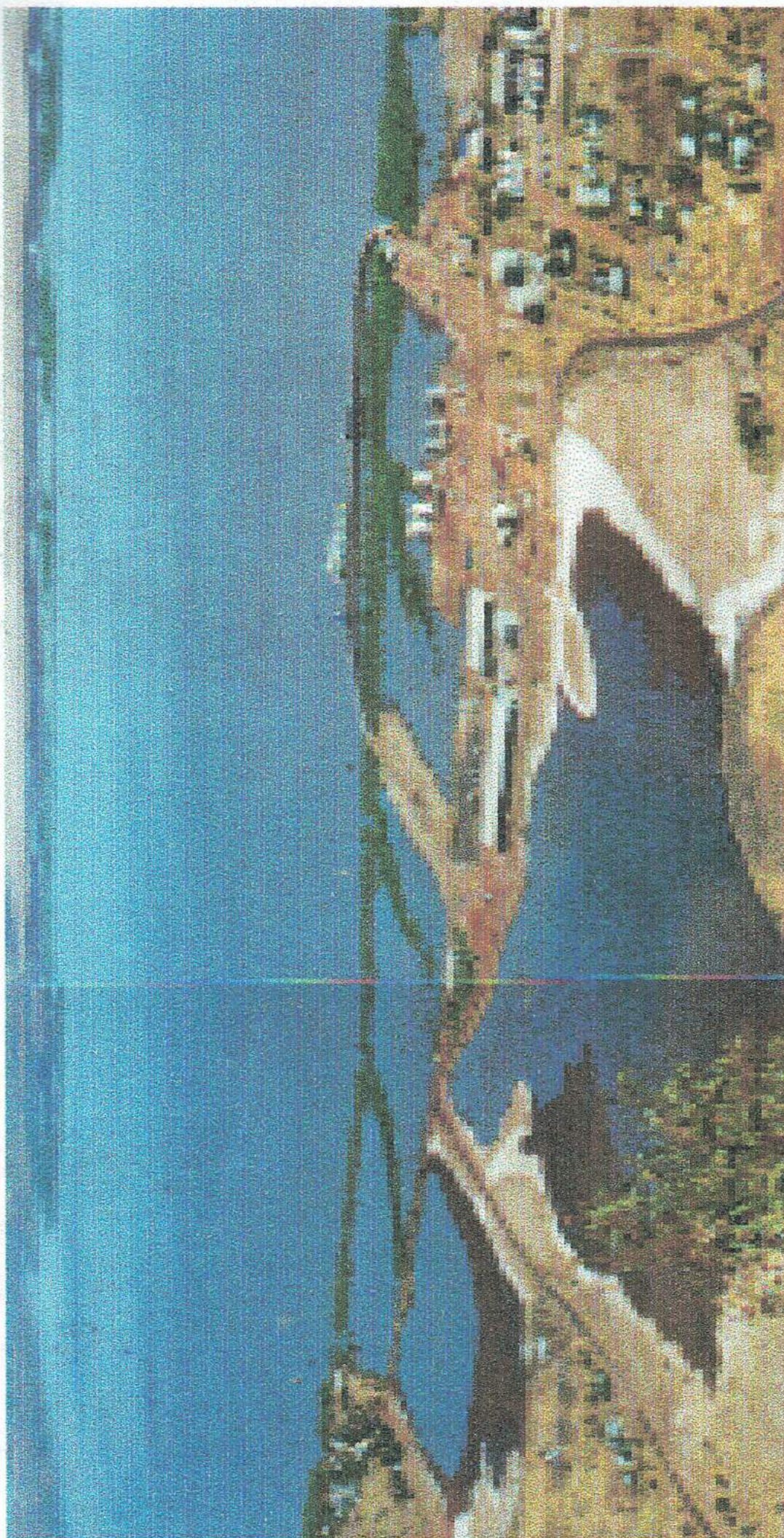




*Johns Creek Fishing Boat Harbour near Point Samson*







*The Port of Wyndham showing the jetty and the port shore installations in the centre and right, the town of Wyndham is on the far left-*





*Bunbury Inner Harbour under construction – 1975 – the outer harbour breakwater berths and the timber jetty are centre background – the No1 inner harbour berth for the export of woodchips is on the left and the SEC power station is on the far right. Work had not yet commenced on the other three berths in the harbor basin. Part of the original Preston River, which had been diverted away from the harbour, is in the foreground. (Refer to layout plan at page 87)*



**Bunbury Inner Harbour - Historical**  
(from Opening Ceremony Brochure – 2 April 1976)

“For more than 130 years, since the days of the traders and whalers, Bunbury has been the commercial hub and vital shipping outlet for the produce of Western Australia's rich South-West Region. In the 1840's sailing ships anchored in the natural protection of- Koombana Bay, while their cargoes were ferried to and from shore on lighters.

In those early days, the mainstay of the port was timber, which, even then, had developed a worldwide reputation in the field of quality hardwoods.

With the subsequent agricultural development of the Bunbury hinterland, export cargoes of wheat, oats and barley together with wool, meat and fruit, assumed growing importance.

The town jetty, built in 1864, was extended nine times in the following 57 years to cater for increasing numbers of ships with deeper draught capacity.

More recent times have seen a start made on development of the region's mineral and mining potential with heavy mineral sands and bauxite being mined, refined and exported in very substantial tonnages.

These developments, together with the general growth of the Region's secondary industrial land its population-have been major contributing factors behind the construction of the new Bunbury Inner Harbour.

Stage 1 of the project- a far-sighted plan adopted by the Western Australian Government in 1968-provides initially for three berths for vessels from 40 000 to 65 000 tonnes.

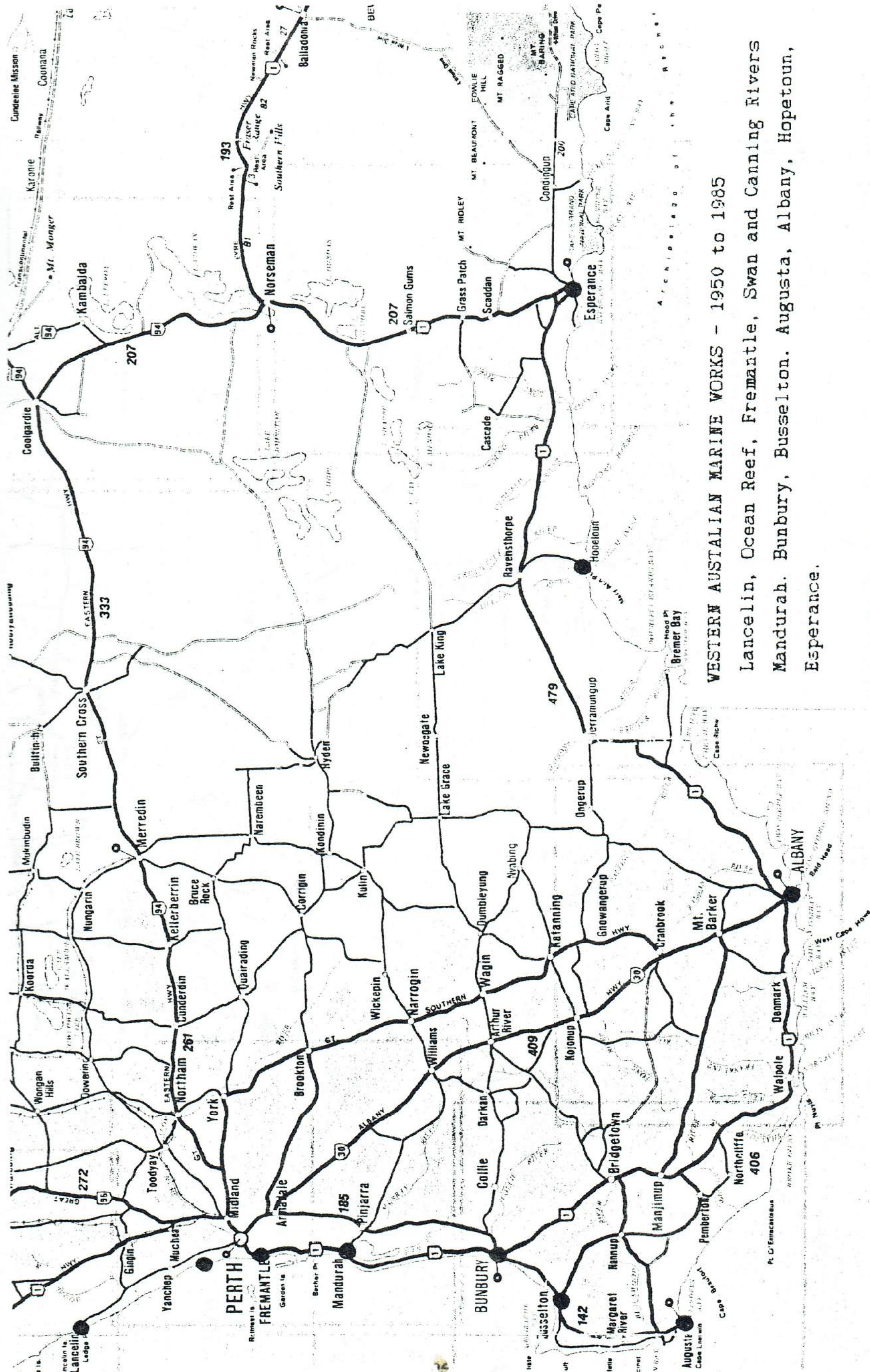
As shipping requirements continue to grow, the Inner Harbour basin is capable of extension to provide a further four berths and, ultimately, it could be more than doubled in size to accommodate up to 14 ships.

The decision to proceed with the Inner Harbour project-announced on February 22 1968 followed a number of proposals dating back to 1896 for developing a harbour in Leschenault Inlet”.



# WESTERN AUSTRALIA SOUTHERN AREAS

77



## WESTERN AUSTRALIAN MARINE WORKS - 1950 to 1985

Lancelin, Ocean Reef, Fremantle, Swan and Canning Rivers  
Mandurah, Bunbury, Busselton, Augusta, Albany, Hopetoun,  
Esperance.

80 60 40 20 0 80 160 240

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Scale in Kilometres

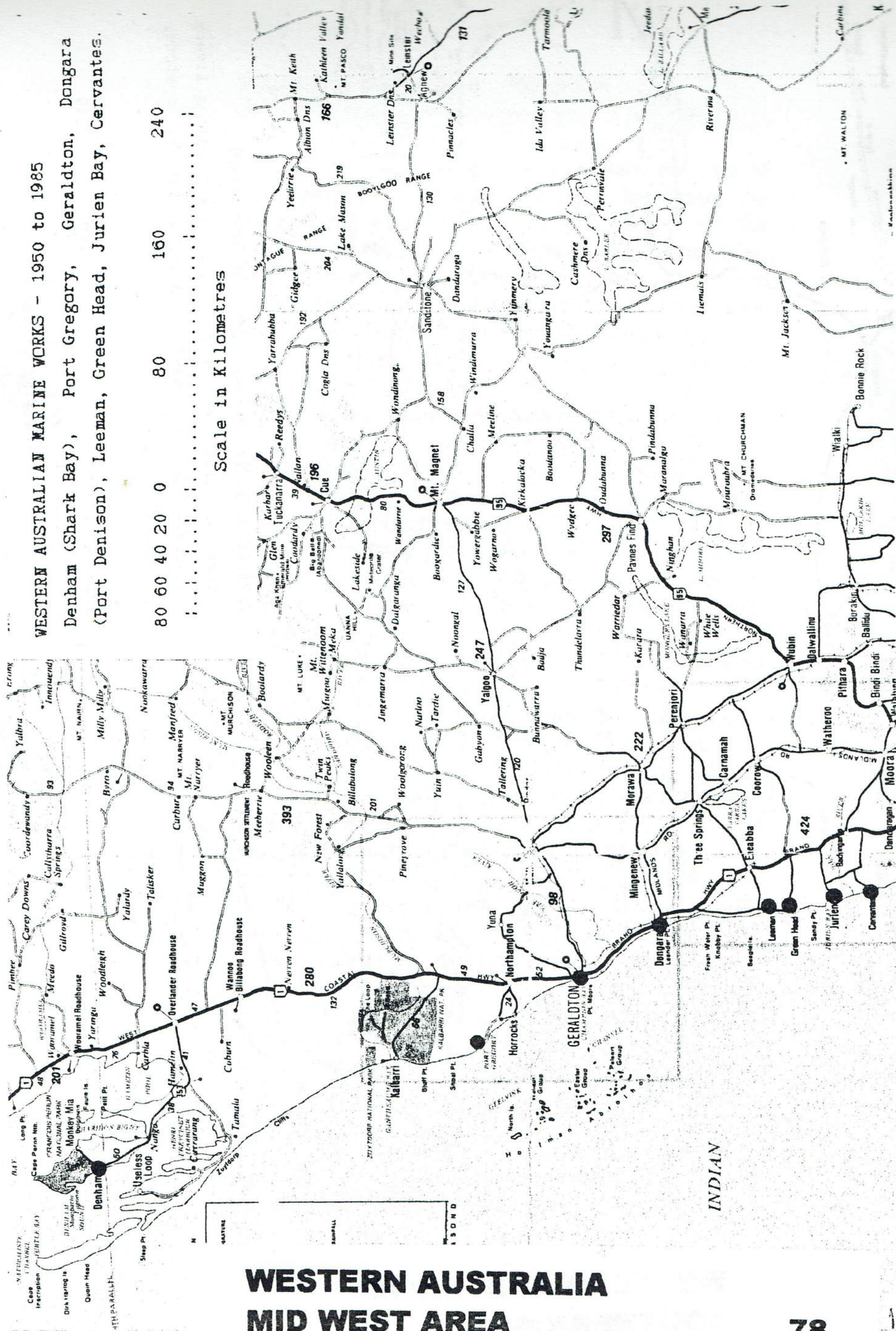


# WESTERN AUSTRALIAN MARINE WORKS - 1950 to 1985

Denham (Shark Bay), Port Gregory, Geraldton, Dongara  
(Port Denison), Leeman, Green Head, Jurien Bay, Cervantes.

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Scale in Kilometres



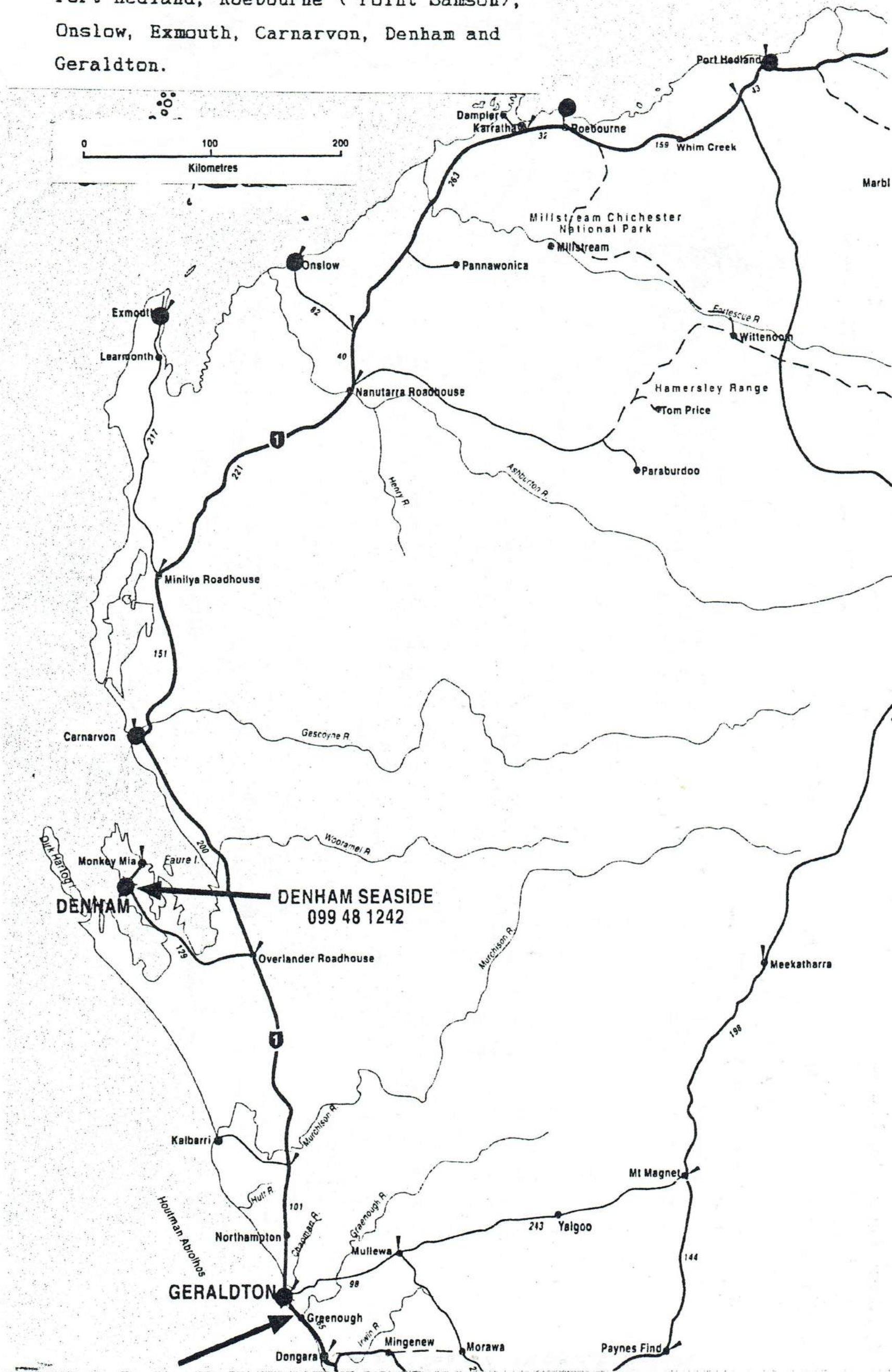
## WESTERN AUSTRALIA MID WEST AREA



# WESTERN AUSTRALIAN MARINE WORKS

- 1950 to 1985

Port Hedland, Roebourne ( Point Samson ),  
Onslow, Exmouth, Carnarvon, Denham and  
Geraldton.





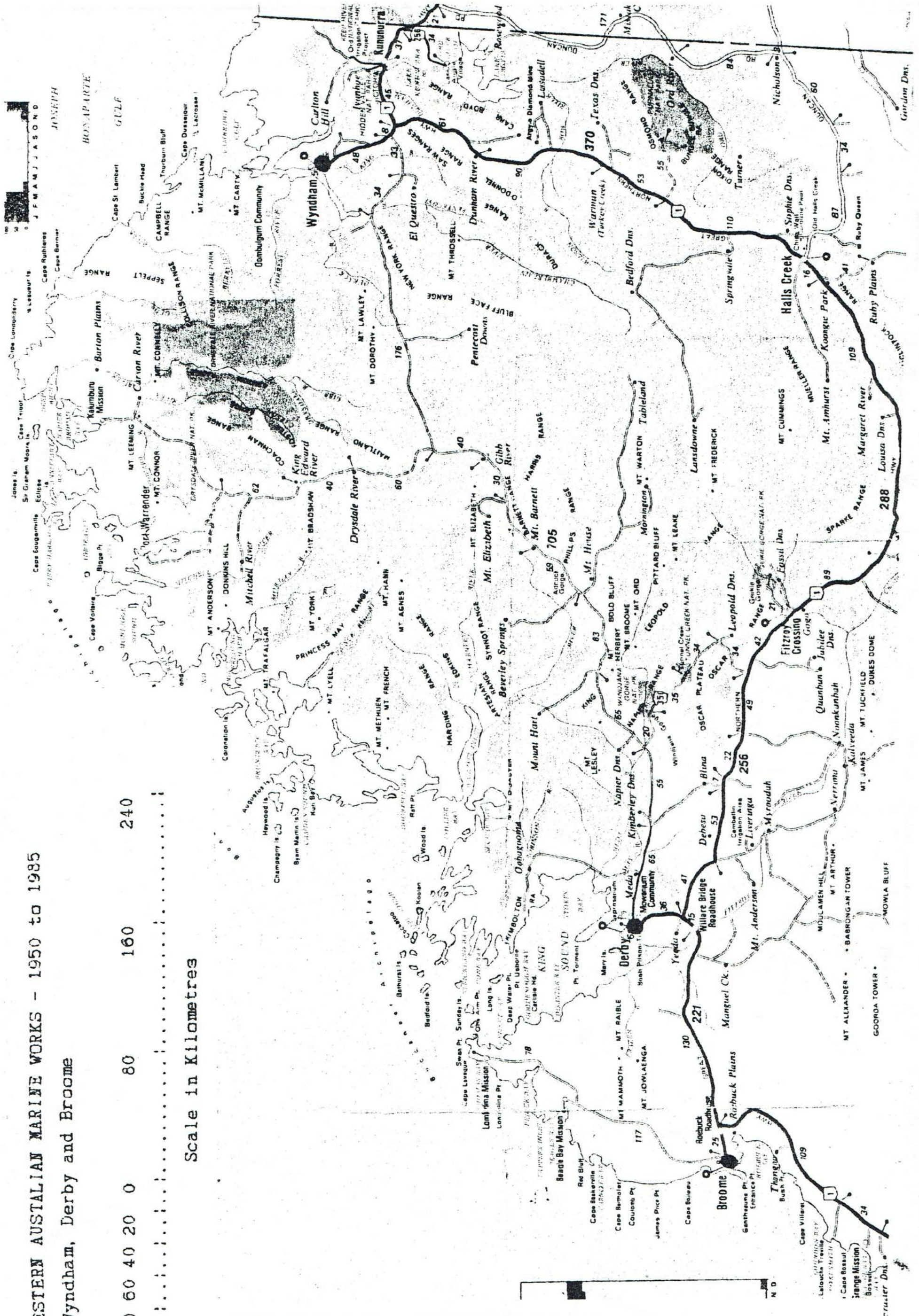
WESTERN AUSTRALIAN MARINE WORKS - 1950 to 1985

Wyndham, Derby and Broome

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Scale in Kilometres

WESTERN AUSTRALIA  
KIMBERLEY AREA





# REGIONAL PORTS OF WESTERN AUSTRALIA

As and up to 1983 with some later amendments.  
With acknowledgement to the Public Works  
Department of Western publication -Regional Ports of  
Western Australia - December 1983

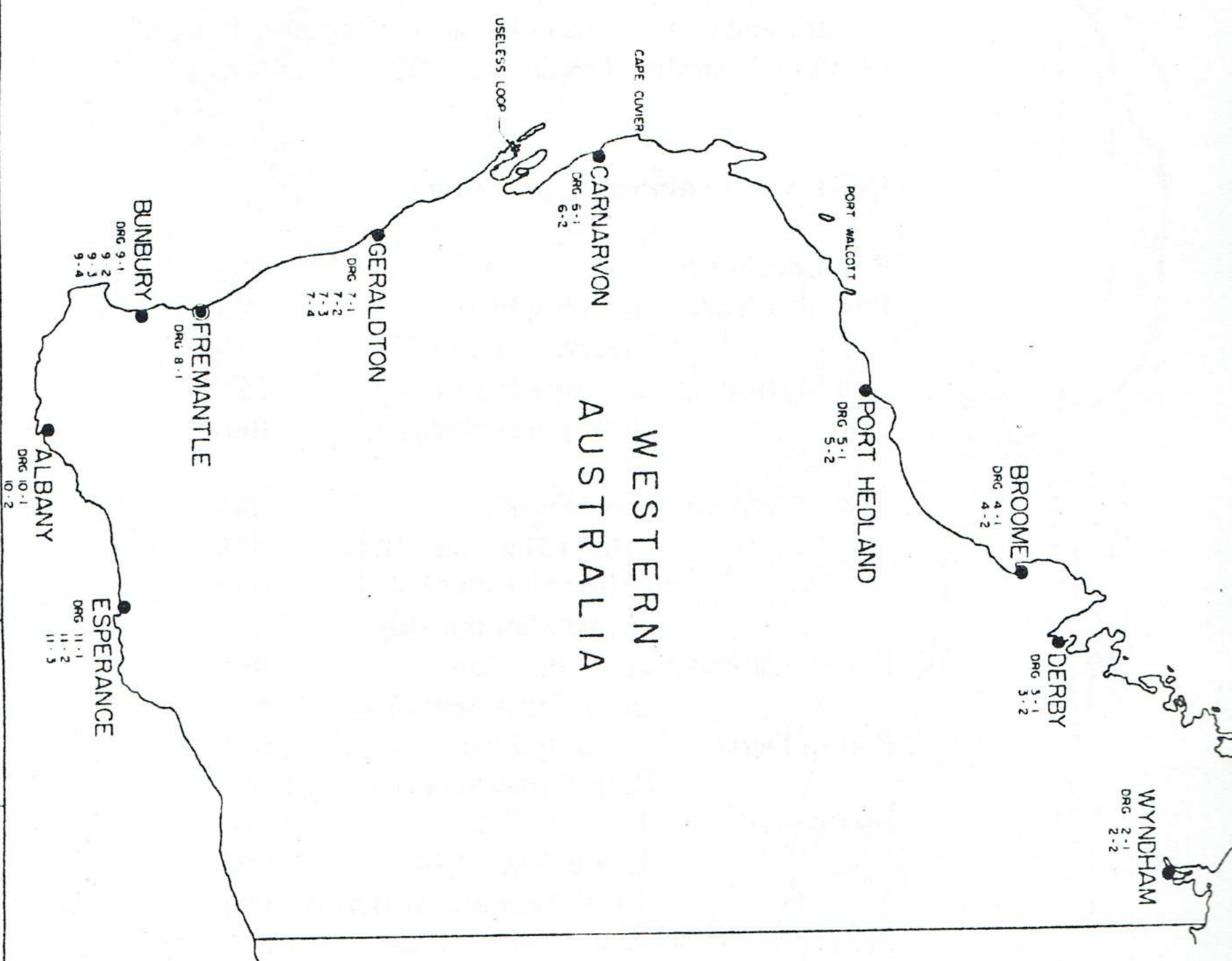
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Locality Plan	083
Sections of Berths	084
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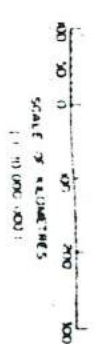


# WESTERN AUSTRALIA REGIONAL PORTS

82



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GENERAL NOTES		PUBLIC WORKS DEPARTMENT — WESTERN AUSTRALIA	
REGIONAL PORTS OF WESTERN AUSTRALIA		LOCALITY PLAN	
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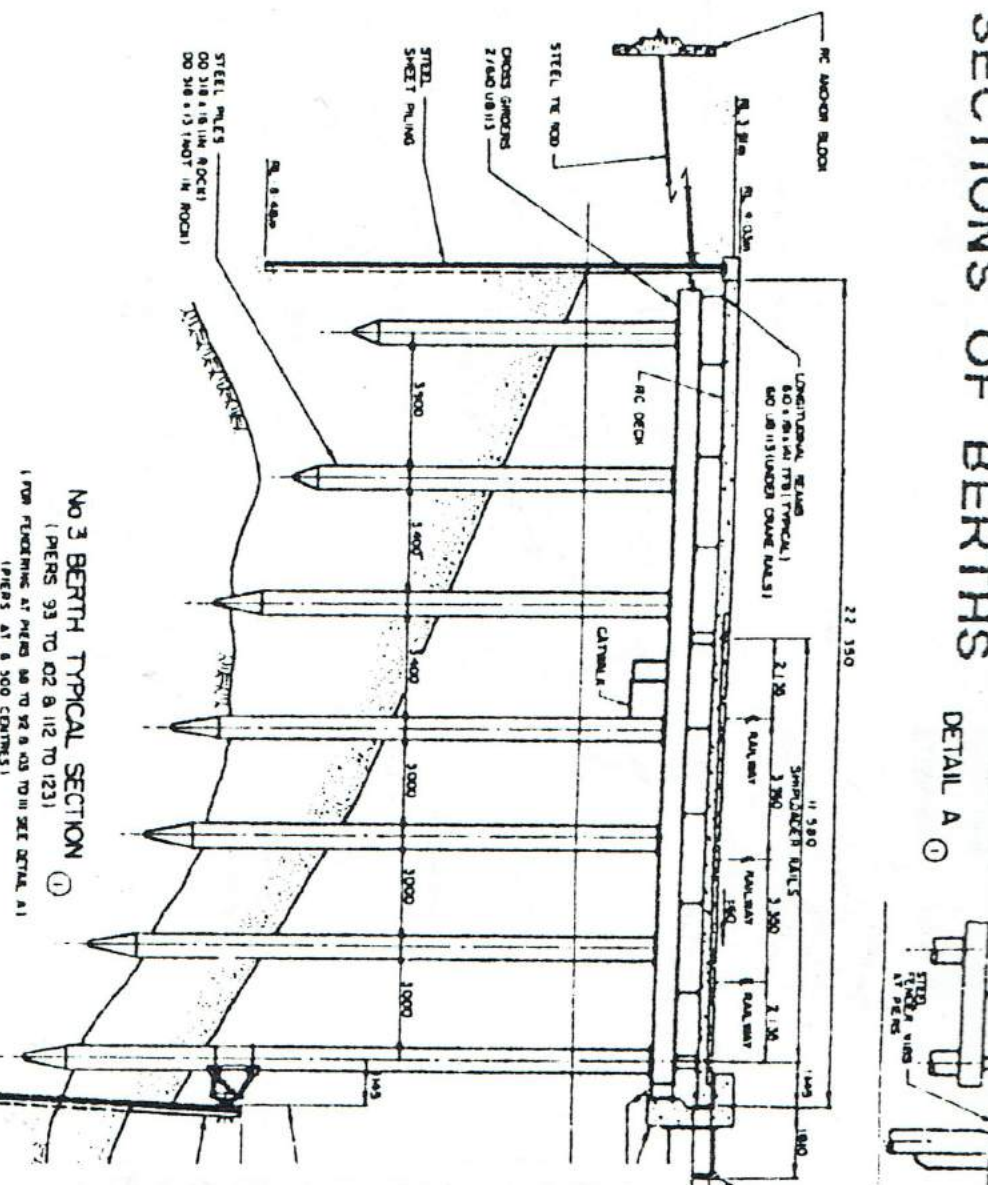
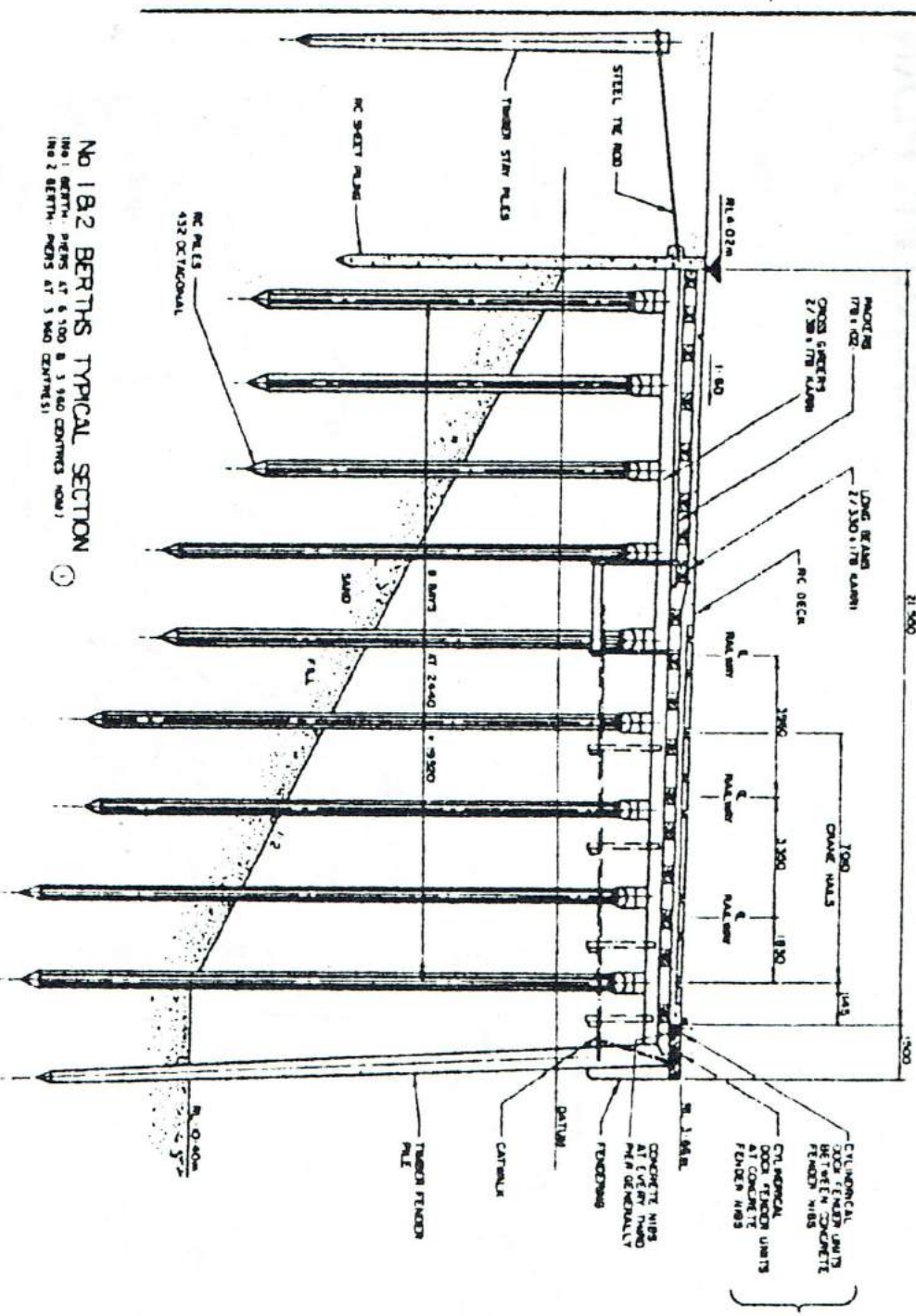






# PORT OF ALBANY CROSS SECTIONS OF BERTHS

DETAIL A

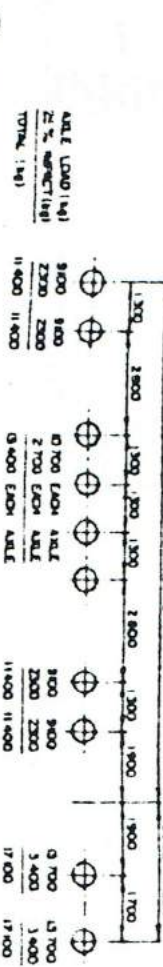


## DESIGN LOADINGS FOR NO 1, 2 & 3 LAND BACKED BERTHS

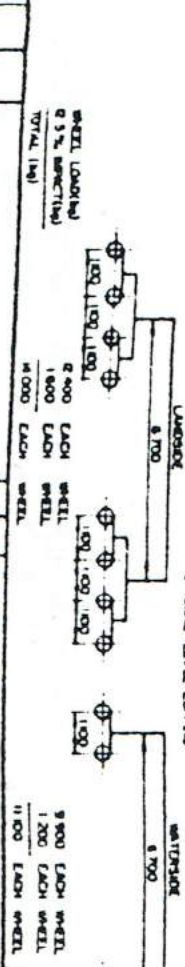
### A STACKED LOADS

NO 1 & 2 BERTHS (2,500 TONNE) INCLUDING 25% DEAD WEIGHT ON BERTHS  
NO 3 BERTHS (1,500 TONNE) INCLUDING 25% DEAD WEIGHT ON BERTHS  
DESIGN SHIP LIFTING LOCOMOTIVE

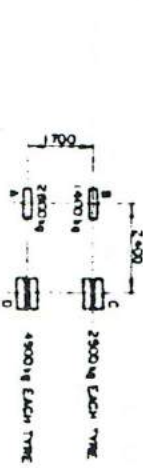
### B RAILWAY LOADS



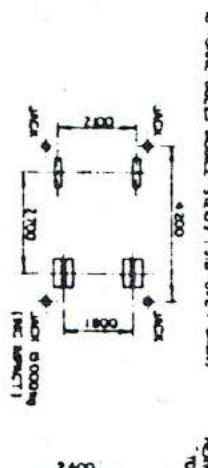
### C CRANE AND SHIPLOADER LOADS



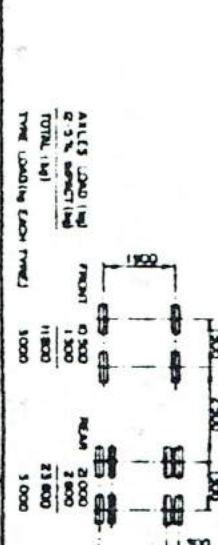
### D THREE COALS WHEELS (WITH JIB OVER D)



### E THREE COALS WHEELS (WITH JIB OVER A)



### F HEAVY ROAD VEHICLES



### NO 3 BERTH TYPICAL SECTION

(PIERS 93 TO 92 & 112 TO 123)  
FROM FLEETING AT PIER 93 TO 92 & 112 TO 123 SEE DETAIL A1  
(PIERS AT 500 CENTRES)

# PORT OF ALBANY CROSS SECTIONS OF BERTHS

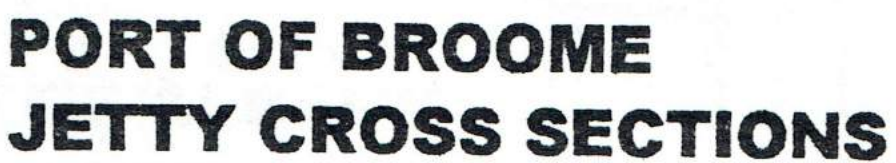
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PORT OF ALBANY					
CROSS SECTIONS AND DESIGN LOADINGS					
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## DESIGN LOADINGS ON HEAD



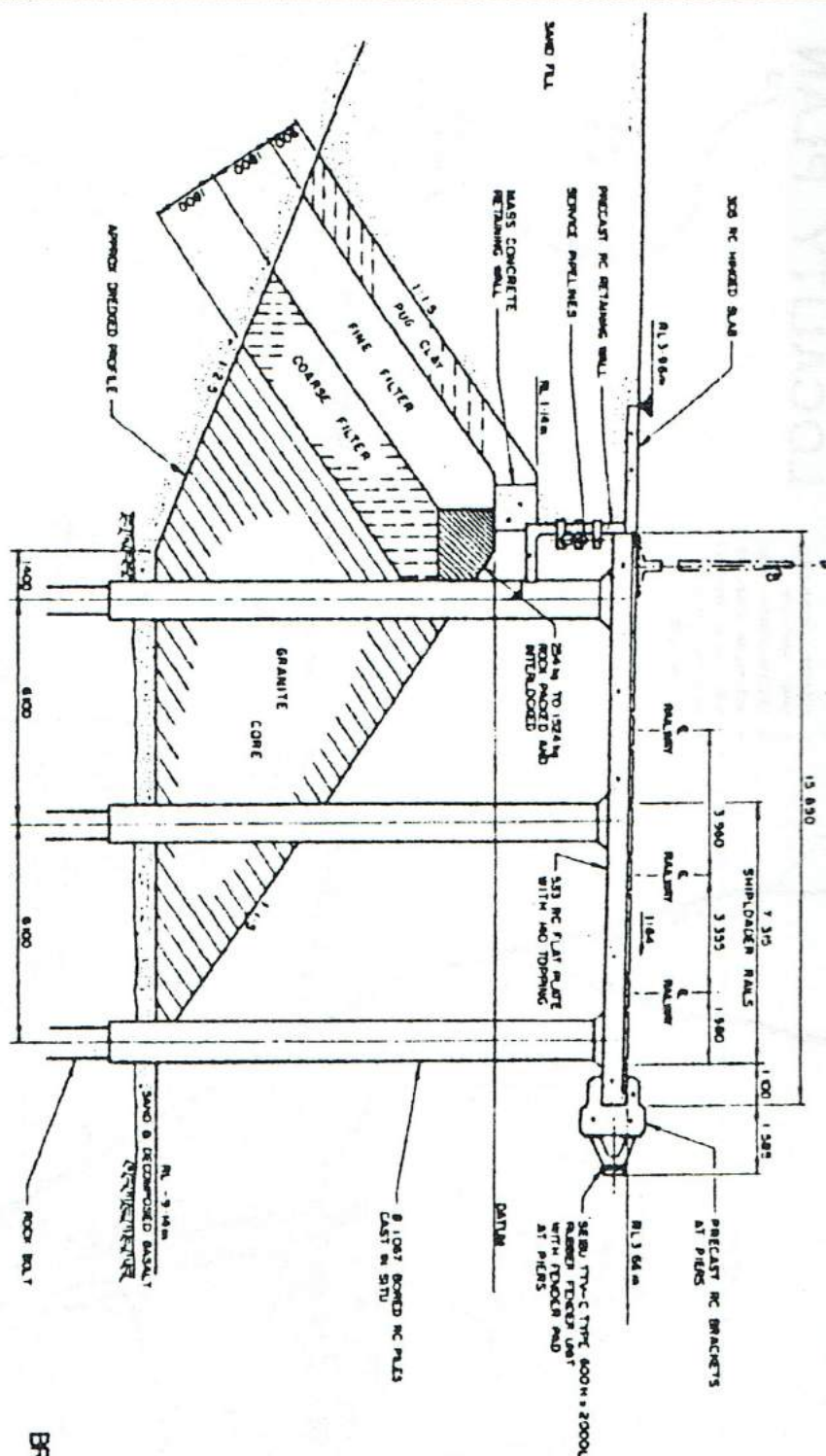
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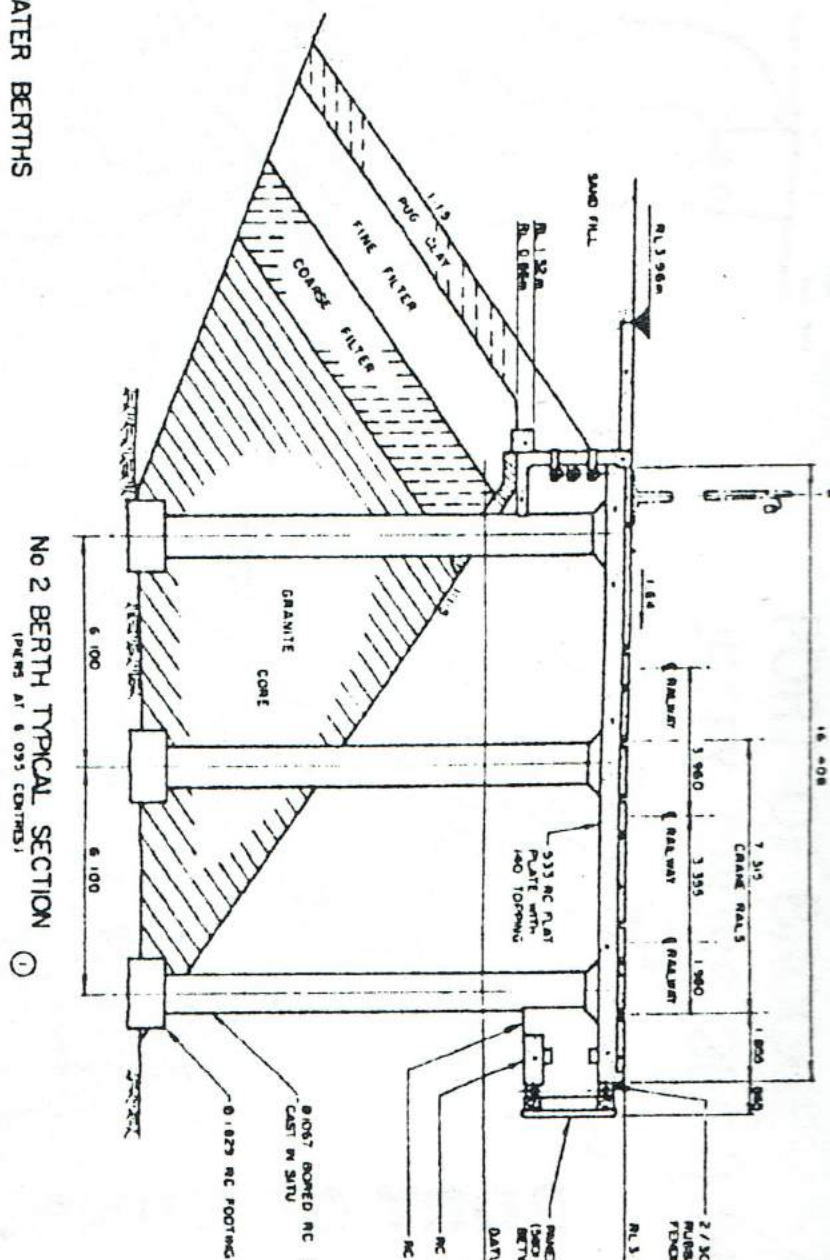






NO. 1 BERTH TYPICAL SECTION  
(PETERS AT 6 093 CENTRES) ①

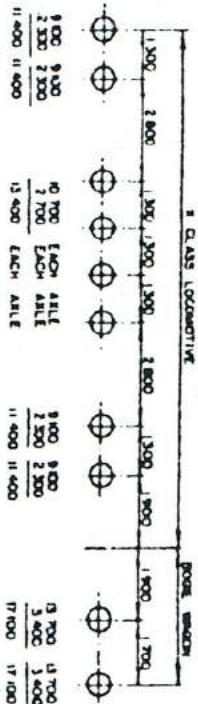
## BREAKWATER BERTHS



NO 2 BERTH TYPICAL SECTION  
(PAGES AT 6.035 CONTINUED)

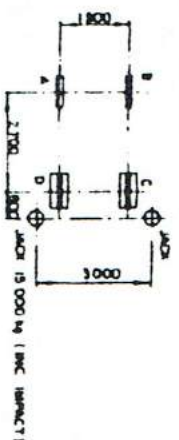
# DESIGN LOADINGS FOR BREAKWATER BERTHS

- (A) STACKED LOADS  
ON WHEEL DECK 3 600 kg/m<sup>2</sup>. AT BACK OF WHEEL 4 900 kg/m<sup>2</sup>
- (B) RAILWAY LOADS



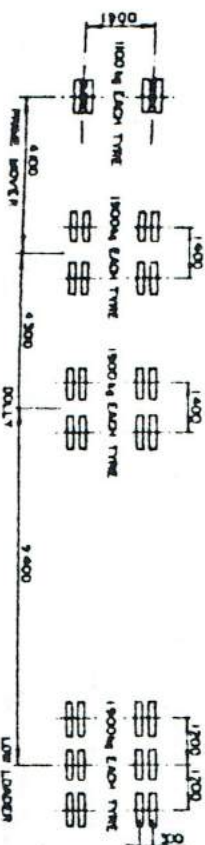
- ③ CRANE LOADS

NO. 8 TONE COLLECT NORMAL 912105 1 WITH JIB OPEN 01



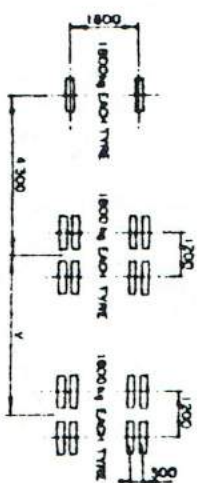
- ① HEAVY ROAD VEHICLES  
20 TONS OR LESS LOADS, APPROX.

AS THERE WAS LOADS, MEASUREMENT THE LOADS DOWN



- (E) STANDARD TRUCK LOADING

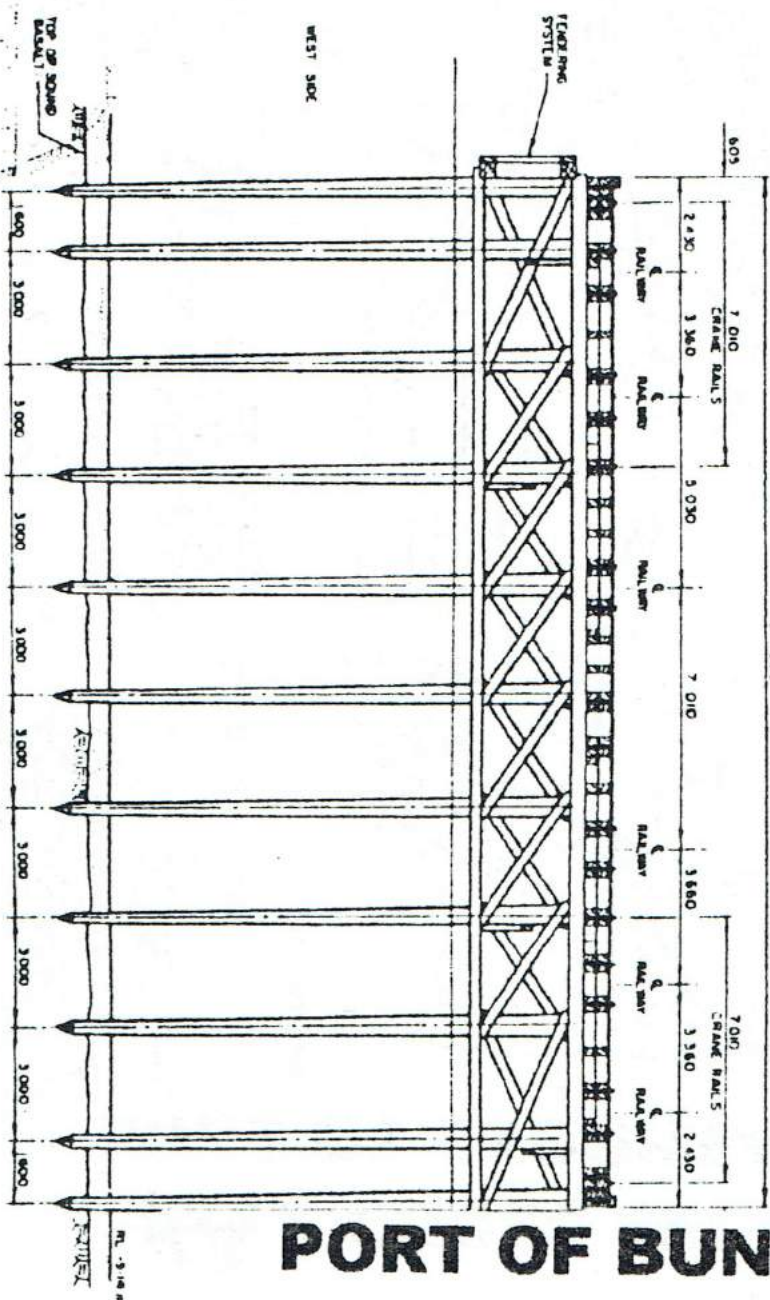
BEHIND DESIGNED FOR STANDARD 48 IN TALL  
114 700 kg ACORN LOADS ON DUAL WHEEL TANDUM AXLES



- ⑦ BERTHING LOAD

20000 TONNE VESSEL (LOADED DISPLACEMENT MASS) AT 0.15 m/s,  
90% KINETIC ENERGY ABSORBED BY STRUCTURE

PORT OF BUNBURY  
CROSS SECTIONS OF  
OUTER HARBOUR BERTHS



TYPICAL SECTION THROUGH JETTY HEAD

①  
TIMBER JETTY  
PEAS AT 3 660 CORDINGS

CLOSED TO SHIPPING

11.200

C

GENERAL NOTES  
UNLESS OTHERWISE SHOWN ALL DIMENSIONS ARE IN MILLIMETERS  
SEE DIM SHEET 3-8-1 FOR LOCALITY PLAN.

THIS DISCusses THE IMPORTANCE OF THE MATERIALS AND METHODS USED IN THE DESIGN AND CONSTRUCTION OF COMMERCIAL BUILDINGS, AND THE EFFECTS OF THE DESIGN AND CONSTRUCTION ON THE PERFORMANCE OF THE BUILDING. THE DISCussion IS BASED ON THE RESULTS OF A RESEARCH PROJECT WHICH WAS CONDUCTED AT THE UNIVERSITY OF CALIFORNIA, BERKELEY, AND THE RESULTS ARE PRESENTED IN THE FORM OF A SERIES OF PICTURES AND A SUMMARY OF THE RESULTS.

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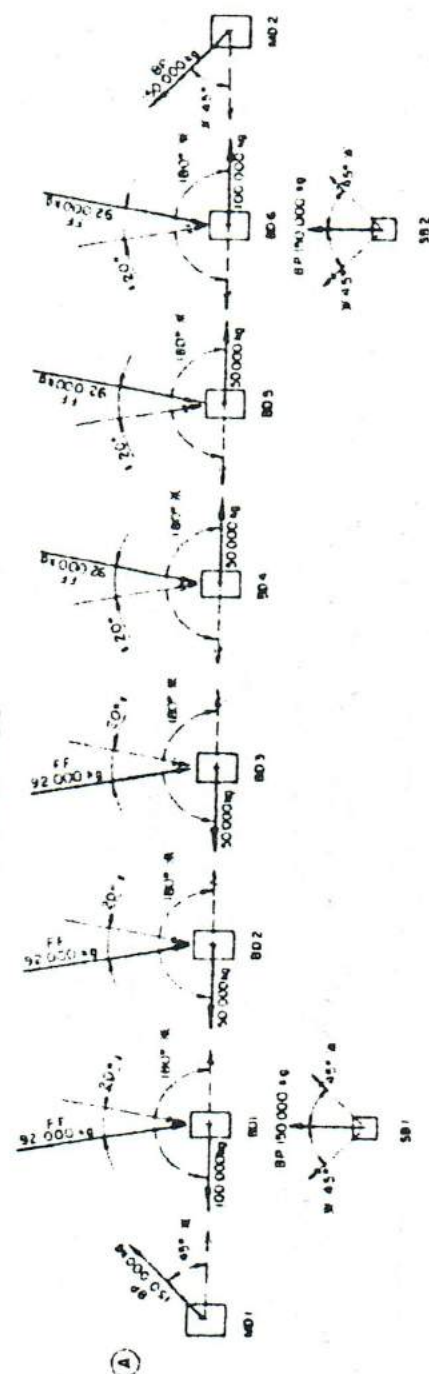
PUBLICWORKS DEPARTMENT - WESTERN AUSTRALIA	
REGIONAL PORTS OF WESTERN AUSTRALIA PORT OF BUNBURY CROSS SECTIONS AND DESIGN LOADINGS	
APPROVED <i>[Signature]</i> DATE 26-11-89 <i>[Signature]</i> Mr J. GARDNER - MANAGER & PROJECT	PWD WA 53923-9-2



## 89

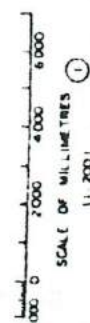


# DESIGN LOADING ON DOLPHINS & STORM BOLLARDS



(B) BERTHING LOAD

500G TANK VESSEL | LOADED DISPLACEMENT MASS: AT 0.13 m/s  
50% KINETIC ENERGY ABSORBED BY STRUCTURE



SCALE OF MILLIMETRES

...the ... ..

GENERAL NOTES  
UNLESS OTHERWISE SHOWN ALL DIMENSIONS ARE IN MILLIMETERS  
SEE DRG 5323-9-1 FOR LOCALITY PLAN

GENERAL NOTES

90 : MOORING DOCKING  
90 : BREAKING DOCKING

SB : STORM BOLLARD  
FF : FINDER FORCE

SP - BOLLARD PULL  
: RANGE OF CORRECT  
INCLUDES FACTOR  
: RANGE OF CORRECT

**PUBLIC WORKS DEPARTMENT — WESTERN AUSTRALIA**  
**REGIONAL PORTS OF WESTERN AUSTRALIA**  
**PORT OF BUNBURY**  
**CROSS SECTION AND DESIGN LOADINGS**

**CROSS SECTION AND DESIGN LOADINGS**

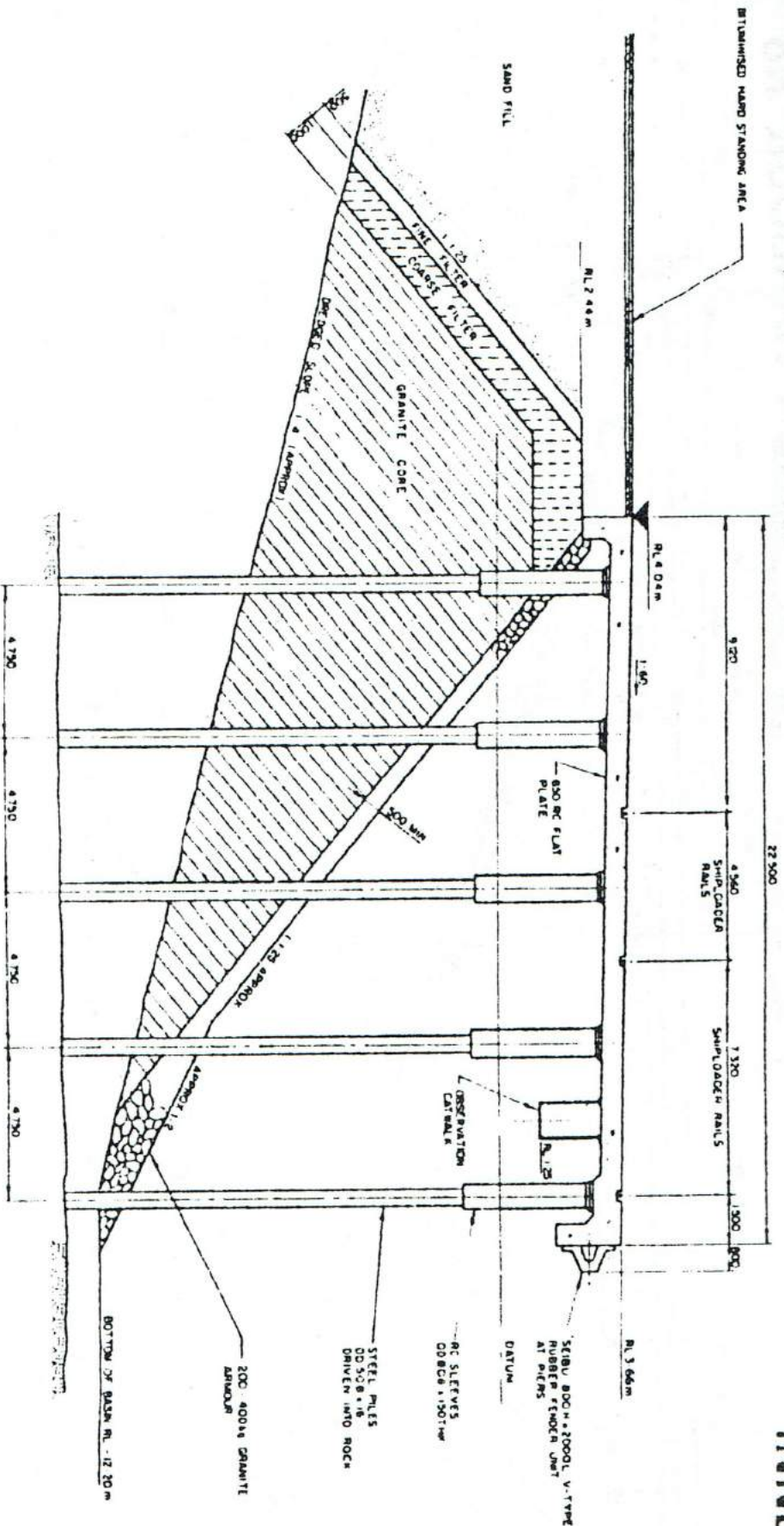
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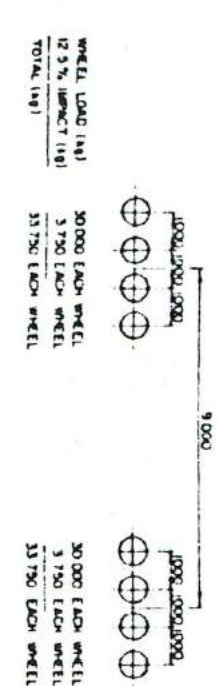
PORT OF BUNBURY  
CROSS SECTION OF  
INNER HARBOUR NO 2 BERTH



- REFERENCE PLANS
- OUTER HARBOUR
  - PRELIMINARY BERTH NO 1
  - RECONSTRUCTION (1971) DIMENSIONS
  - BRUSHED SAND STANDING AREA
  - TIMBER ATTY
  - PRELIMINARY (1908-1943)
  - RECONSTRUCTION (1971) DIMENSIONS
  - ATTACHED DOCK PERS
  - SLIPWAY (1971)
  - APPROACH CHANNEL - SOUNDINGS 1982
  - INNER HARBOUR
  - NO 2 BERTH (WOOD CHIP)
  - NO 2 BERTH (ALCOA)
  - RECONSTRUCTION
  - LEAKS & LICKERS
  - NAVIGATION AIDS
  - HYDROGRAPHIC SURVEY (1971)
  - SOUNDINGS (1971)
  - PORT BOUNDARY
  - LEAKS
  - ADRIALTY CHARTS

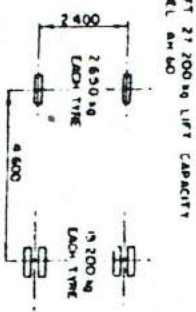
DESIGN LOADINGS FOR NO 2 BERTH

- (A) STACKED LOADS  
ON WHARF DECK 4.000 kg/m<sup>2</sup> AT BACK OF WHARF 3.000 kg/m<sup>2</sup>
- (B) CRANE AND SHIPLOADER LOADS  
SHIPLOADER



NO 2 BERTH INNER HARBOUR TYPICAL SECTION  
(PIERS AT 4.750 CENTIMETERS)

- (C) HEAVY ROAD VEHICLES  
SCHEDULE 96 WHEELED LOW LOADER WITH GROSS LOAD OF 300,000 kg
- (D) STANDARD TRUCK LOADING  
BERTH DESIGNED FOR STANDARD 45 TON TRUCK (14,700 kg axle loads on dual wheel tandem axles)
- (E) BERTHING LOAD  
48,000 TONNE VESSEL (LOADED DISPLACEMENT MASS) AT 0.15 m/s  
50% OF KINETIC ENERGY ABSORBED BY STRUCTURE



GENERAL NOTES  
UNLESS OTHERWISE SHOWN ALL DIMENSIONS ARE IN MILLIMETRES  
SEE DWG 53923-9-1 FOR LOCALITY PLAN

DATE	REVISION	FILE NO
19/08/83	1	53923-9-1

SCALE: AS SHOWN	DESIGN DATE	BOOK
1:100	19/08/83	8008
1:100	19/08/83	8009
1:100	19/08/83	8010

PUBLIC WORKS DEPARTMENT - WESTERN AUSTRALIA  
REGIONAL PORTS OF WESTERN AUSTRALIA  
PORT OF BUNBURY  
CROSS SECTION AND DESIGN LOADINGS  
DWG NO 53923-9-4



# PORT OF CANARVON LOCALITY PLAN



## FORMATION

ART DATA (1) WHICH IS ZERO ON THE TIDE  
- 0.14 m BELOW AND

FRESH WATER  
AVAILABLE FROM

PLAN (C)

JETTY (OCEAN)  
 SOUNDINGS (1980)  
 BEAT HARBOUR  
 LEASES & TENANT ARRANGEMENT  
 JETTY LEVEL JETTY  
 SHIPWAY JETTY  
 DREDGING & RECLAMATION  
 SOUNDINGS  
 APPROXIMATE CHANNEL SOUNDINGS  
 THE "PACIFIC" SOUNDINGS (1980)  
 NAVIGATION AIDS  
 PORT BOUNDARY  
 HYDROGRAPHIC SURVEY 1982 "HAWAII"  
 SONARITY CHARTS

SCALE OF METRES (1:20,000) ①

① 10000211  
11:200001

PUBLIC WORKS DEPARTMENT - WESTERN AUSTRALIA  
REGIONAL PORTS OF WESTERN AUSTRALIA  
PORT OF CARNARVON  
LOCALITY PLAN AND SERVICES DATA

DESIGN CALC.	800A
CHECKED	800A
DRAWN PJS	CHECKED CS/JMS
ISSUED	CHECKED
<i>[Signature]</i>	
SUBMITTED	DATE RECEIVED - 1988
	DATE
	<i>[Signature]</i>
	PROJECT NUMBER

SCALE AS SHOWN

DATE

AS SHOWN

[illegible]

GENERAL NOTES  
UNLESS OTHERWISE SHOWN ALL DIMENSIONS ARE IN INCHES.  
SEE DRG 33923-B-2 FOR CROSS SECTIONS

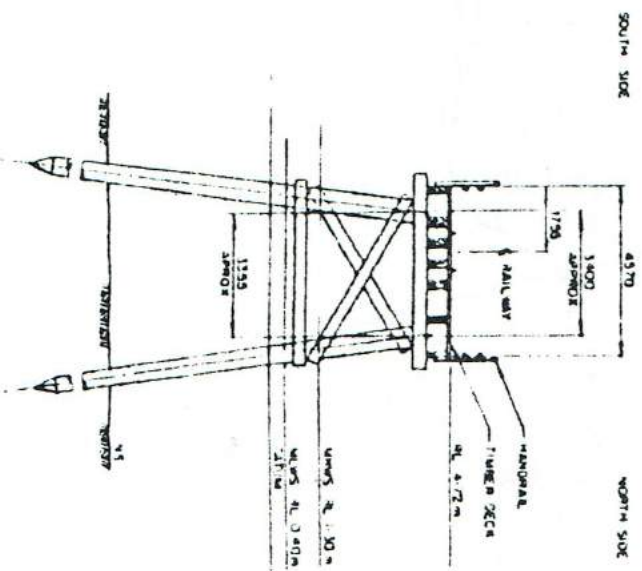
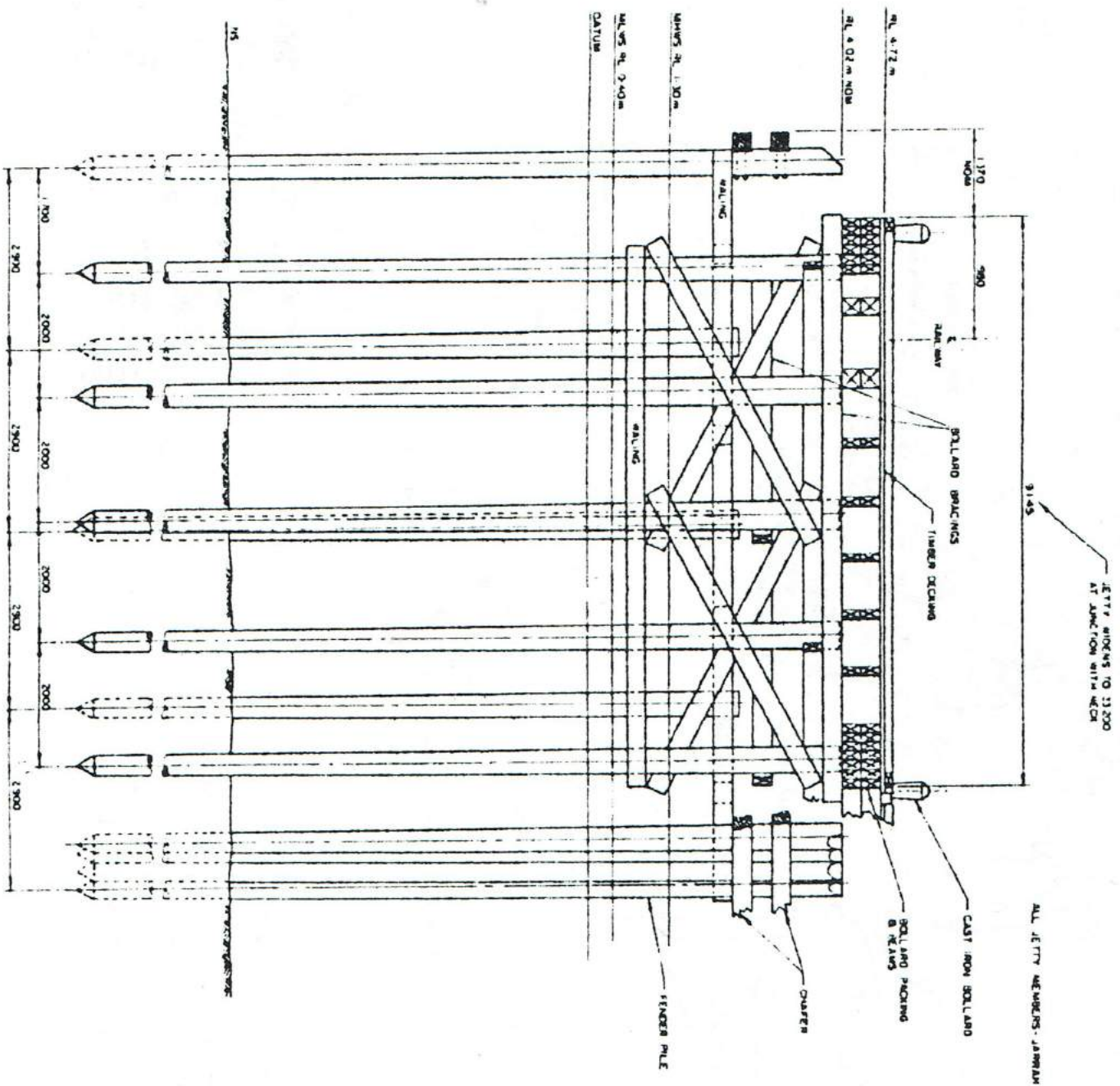
THE UNIVERSITY OF CHICAGO

100

P.W.D. W.A. 53923-6-1



# PORT OF CARNARVON



CROSS SECTION THROUGH NECK  
PIERS AT ~~8150~~ CENTRE (2)

5065

# PORT CARNARVON JETTY CROSS SECTION

92

<p><b>GENERAL NOTES</b></p> <p>UNIT 55 OF DRAWING SHOWS ALL DIMENSIONS ARE IN MILLIMETERS</p> <p>SEE DRG 55923-6-1 FOR LOCALITY IN WA</p>		<p>DATE: 1984/08/01</p> <p>BY: [Signature]</p> <p>REVISION: [Blank]</p> <p>SUBMIT BOXES: [Blank]</p> <p>APP. NO. 1248/83</p>	
<p>THIS DRAWING IS THE PROPERTY OF THE AUSTRALIAN GOVERNMENT AND IS LOANED TO YOU FOR YOUR INFORMATION ONLY. IT IS NOT TO BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM, WITHOUT THE WRITTEN PERMISSION OF THE AUSTRALIAN GOVERNMENT.</p>		<p>SCALE: AS SHOWN</p> <p>UNITS: METRIC</p> <p>UNIT 55 OF DRAWING 55923-6-1 FOR LOCALITY IN WA</p>	
<p>DESIGN CALC: 8004</p> <p>CHECKED: BOOR</p> <p>DRAWING P/S: CROCODILE</p> <p>REMARKS: CROCODILE</p> <p>DATE: 1984/08/01</p>		<p><b>PUBLIC WORKS DEPARTMENT — WESTERN AUSTRALIA</b></p> <p><b>REGIONAL PORTS OF WESTERN AUSTRALIA</b></p> <p><b>PORT OF CARNARVON</b></p> <p><b>CROSS SECTIONS</b></p> <p>DATE: 1984/08/01</p> <p>BY: [Signature]</p> <p>APP. NO. 1248/83</p>	



# PORT OF DERBY LOCALITY PLAN

**TABLE 7**



CRGO HANDLING

AVAILABLE RIGHT ALONG THE HEATIN

AVAILABLE RIGHT ALONG THE BEACH

L SERVICE POINTS

PROVIDED AT THE BEACH FOR THE DISCHARGE OF REFINED  
PETROLEUM PRODUCTS

L SERVICE POINTS  
PROVIDED AT THE TERM FOR THE DISCHARGE OF REFINED  
PETROLEUM PRODUCTS

**ELECTRICAL SERVICES**

POWER AND LIGHTING SUPPLY AT 480/250 + 50 Hz  
FLOOD LIGHTING IS PROVIDED FOR NIGHT WORKING TO ILLUMINATE  
ROADS AND WORKER AREAS  
ELECTRICITY IS PROVIDED ALONG WITH  
WATER SUPPLY TO KID'S CAMP AND SHELTER  
DISCHARGE OF FLAMMABLE GASES  
SPECIAL ARRANGEMENT WITH THE HARBOUR MASTER

CONNECT THE DOT WITH XERO AND THE MINERAL AND THE BEST KIMBERLEY

## DEPARTMENT OF MARINE AND HARBOUR SERVICE

NO AUTOMATIC FIVE RECORDS ARE KEPT BUT PREDICTIONS ARE AVAILABLE

EXEMPT

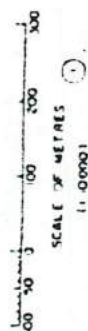
6177	39297
20005 /ARD	16680
HYDROGRAPHIC SURVEY (1982)	56C49
WINDMILLS OVER BEACH (1974 INWARDS)	30919
PORT BOUNDARY	39072
NAVIGATION AIDS	64298
LOCALITY CHARTS	

ONT MOBILE WIRELESS, INC.

[illegible]

THE UNIVERSITY OF CHICAGO

WEAT



GENERAL NOTES

UNLESS OTHERWISE SHOWN ALL DIMENSIONS ARE IN METRES  
SEE DRG 19923-3-2 FOR CROSS SECTIONS AND DESIGN LOADINGS

DESIGNATION OF

44-38861-100

AS SHOWN

PUBLIC WORKS DEPARTMENT - WESTERN AUSTRALIA  
REGIONAL PORTS OF WESTERN AUSTRALIA  
PORT OF DERBY  
LOCALITY PLAN AND SERVICES DATA

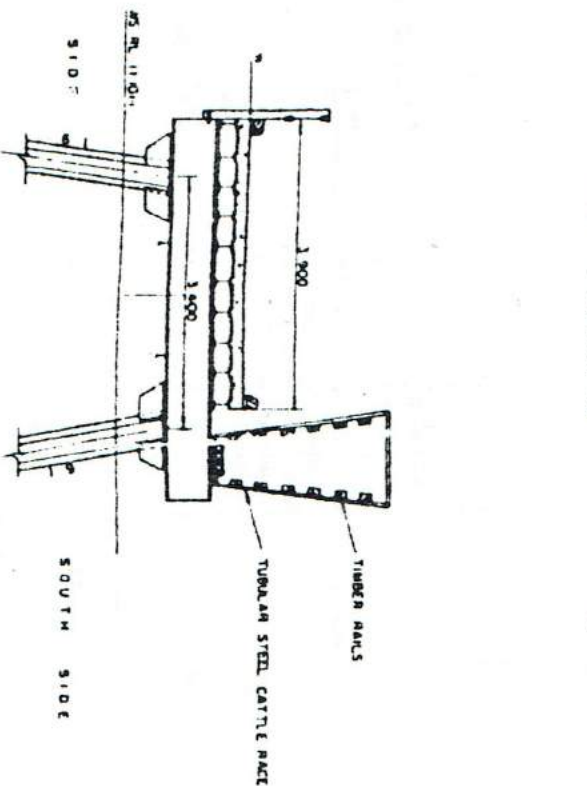
1990



# PORT OF DERBY JETTY CROSS SECTIONS

94

ROSS SECTION THROUGH NORTHERN NECK  
(PIERS AT 9.143 CENTRES NOW)



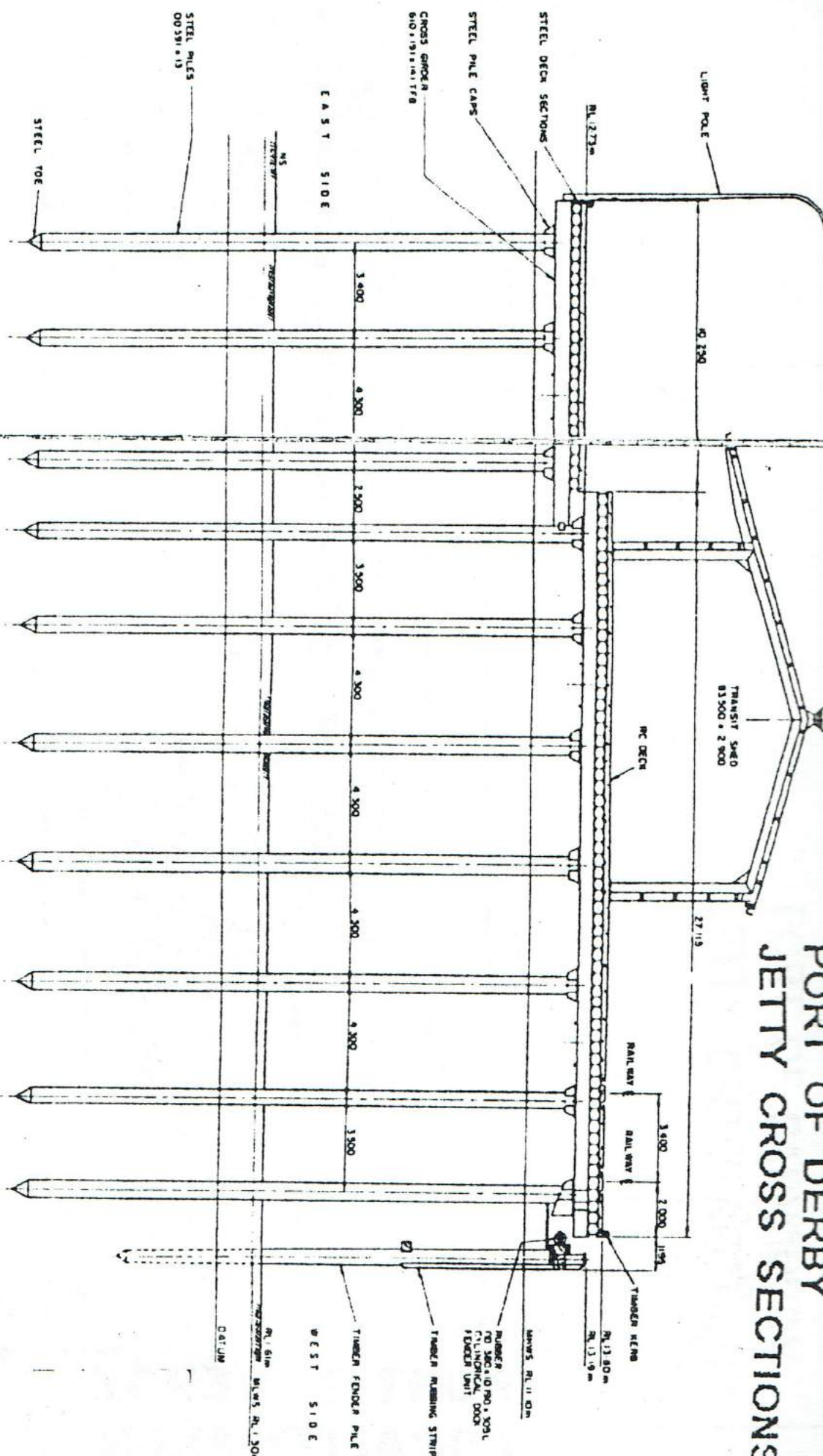
CROSS SECTION THROUGH SOUTHERN NECK  
(PIERS AT 9.143 CENTRES NOW)

2

## DESIGN LOADINGS ON HEAD

- A STACKED LOAD  
3400 kg/m<sup>2</sup>
- B RAILWAY LOAD  
2 CLASS DIESEL SHUNTING LOCOMOTIVE AXLE LOADS
- C CRANE LOAD  
40 TONNE COALS MOBILE SITE DS

CROSS SECTION THROUGH HEAD  
(PIERS AT 7.315 CENTRES)



## HEAVY ROAD VEHICLES

- D 21 TONNE TRUCK  
APPROPRIATE TYRE LOADS SHOWN
- E STANDARD TRUCK LOADING  
40 TONNE TRUCK  
APPROPRIATE TYRE LOADS SHOWN
- F BERTHING LOAD  
40 TONNE TRUCK  
APPROPRIATE TYRE LOADS SHOWN

SCALE OF MILLIMETRES  
1:1000

SCALE OF MILLIMETRES  
1:1000

SCALE OF MILLIMETRES  
1:1000

## GENERAL NOTES

UNLESS OTHERWISE SHOWN ALL DIMENSIONS ARE IN MILLIMETRES

SEE DWG 53923-3-1 FOR LOCALITY PLAN

REVISED TO 28.5.1983

DATE 28.5.1983

DATE 28.5.1983

DATE 28.5.1983

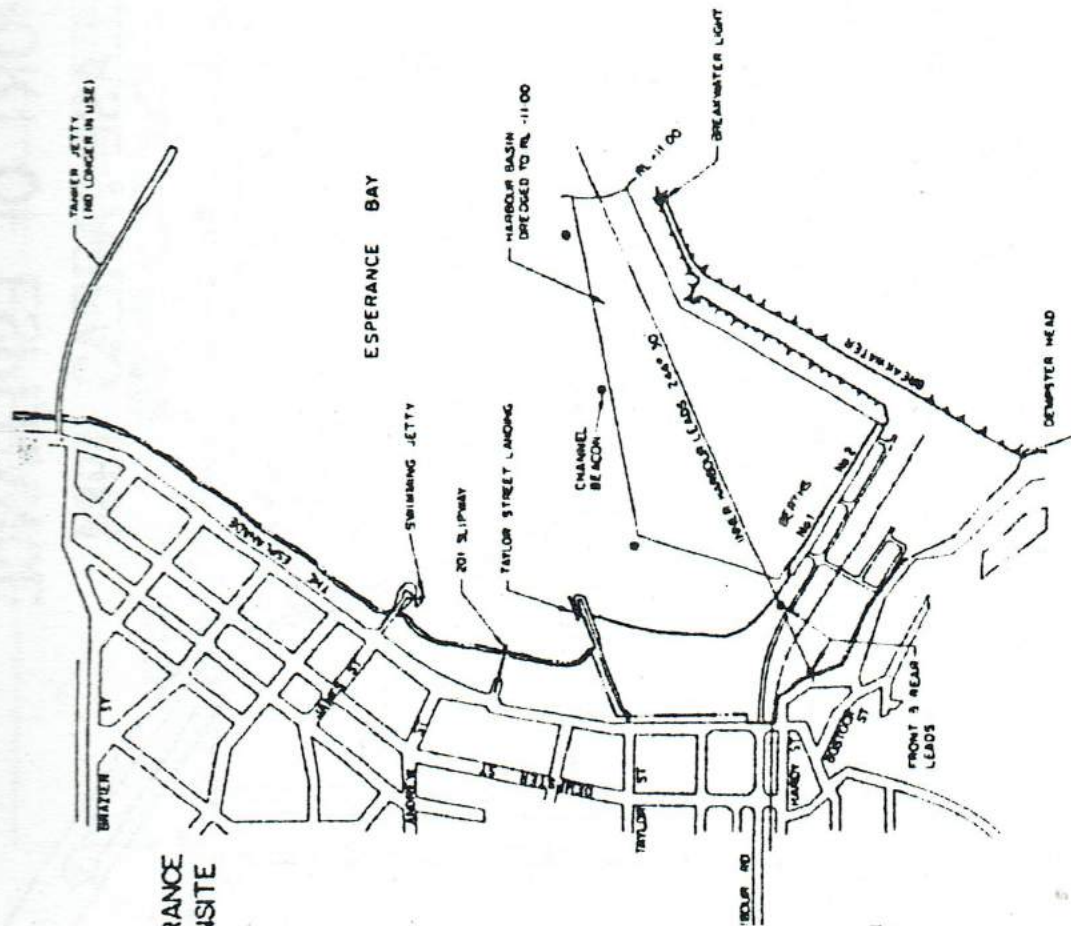
DATE 28.5.1983

PORT OF DERBY  
JETTY CROSS SECTIONS

PUBLIC WORKS DEPARTMENT - WESTERN AUSTRALIA  
REGIONAL PORTS WESTERN AUSTRALIA  
PORT OF DERBY  
CROSS SECTIONS AND DESIGN LOADINGS  
P.W.D. WA 53923-3-2



# PORT OF ESPERANCE LOCALITY PLAN



## PORT OF ESPERANCE LOCALITY PLAN

PLAN ①

### T INFORMATION

- ION**  
33° 32' S. LONG 121° 54' E
- A**  
1. IN THE TIDE GAUGE WHICH IS 0.707m BELOW AND
- UNLOCATION**  
A. DEFINED APPROACH IN ESPERANCE BAY THROUGH ENTRANCE  
WELL LEADS INTO BREAKWATER PROTECTED LAND BACKED  
THE 20 TONNE SLIPWAY HAS GENERAL LIGHTING 200m  
3 PHASE 400V 50Hz OUTLETS ARE PROVIDED ON THE 20 TONNE  
SLIPWAY 300m 3 PHASE 400V 50Hz OUTLETS ARE PROVIDED ON  
THE 20 TONNE SLIPWAY 300m 3 PHASE 400V 50Hz OUTLETS ARE PROVIDED ON  
THE 20 TONNE SLIPWAY 300m 3 PHASE 400V 50Hz OUTLETS ARE PROVIDED ON  
THE 20 TONNE SLIPWAY 300m 3 PHASE 400V 50Hz OUTLETS ARE PROVIDED ON
- RTS**  
DUAL CARRO AND PETROLEUM PRODUCTS
- RTS**  
AT BARKLEY, SALT, NICKEL CONCENTRATES, MAGNETITE  
LIVESTOCK
- O HANDLING**  
SHIP'S GEAR AND TWO LIME BELT LOADERS
- SERVICES**  
AN AUTOMATIC TIDE RECORDER IS INSTALLED PREDICTIONS ARE  
AVAILABLE
- GENERAL NOTES**  
UNLESS OTHERWISE SHOWN ALL DIMENSIONS ARE IN METRES  
1. SEE DPG 53923-11-2 FOR LEASES  
2. SEE DPG 53923-11-3 FOR CROSS SECTIONS & DESIGN LOADINGS

### FRESH WATER

AVAILABLE FROM ALL BERTHS.

### OIL SERVICE POINTS

THE NUMBERING OF SHIPS AND THE DISCHARGE OF REFINED  
PETROLEUM PRODUCTS IS FROM NO 2 BERTH

### ELECTRICAL SERVICES

FLOODLIGHTING IS PROVIDED ON THE TWO LAND BACKED BERTHS  
THE 20 TONNE SLIPWAY HAS GENERAL LIGHTING 200m  
3 PHASE 400V 50Hz OUTLETS ARE PROVIDED ON THE 20 TONNE  
SLIPWAY 300m 3 PHASE 400V 50Hz OUTLETS ARE PROVIDED ON  
THE 20 TONNE SLIPWAY 300m 3 PHASE 400V 50Hz OUTLETS ARE PROVIDED ON  
THE 20 TONNE SLIPWAY 300m 3 PHASE 400V 50Hz OUTLETS ARE PROVIDED ON  
THE 20 TONNE SLIPWAY 300m 3 PHASE 400V 50Hz OUTLETS ARE PROVIDED ON

### ROAD SERVICES

THE LAND BACKED BERTHS ARE CONNECTED WITH THE STATE  
ROAD NETWORK

### PORT OPERATING AUTHORITY

ESPERANCE PORT AUTHORITY

### TIDE DATA

AN AUTOMATIC TIDE RECORDER IS INSTALLED PREDICTIONS ARE  
AVAILABLE

### PILOTAGE

PILOTAGE COMPLETION BY ARRANGEMENT WITH RESIDENT  
HARBOR MASTER

### METEOROLOGICAL DATA

RELATING TO THIS AREA MAY BE OBTAINED FROM THE AUSTRALIAN  
BUREAU OF METEOROLOGY PUBLICATION "CLIMATE SURVEY"  
ESPERANCE - REGION 5 - WESTERN AUSTRALIA

PORT BOUNDARY LIMIT ②

### REFERENCE PLANS

- DEPTHS**  
No 1  
40656, 42800  
43410
- SOUNDINGS - (1977 ONWARDS)**  
No 2  
39463, 41821  
48963
- BREAKWATER**  
TAYLOR STREET LANDING
- 20 TONNE SLIPWAY**  
JAMES STREET JETTY & GROVE
- HYDROGRAPHIC SURVEY - 1981**  
PORT BOUNDARY & LEASES  
BANDY CREEK ROAD HARBOUR  
NAVIGATION AIDS  
ADMIRALTY CHARTS
- PWD, WA**  
40656, 42800  
43410  
39463, 41821  
48963  
47287  
51443, 51875  
53461  
48543, 51363  
53130, 51619  
41725  
AUS 119, BA 4059



PUBLIC WORKS DEPARTMENT - WESTERN AUSTRALIA  
REGIONAL PORTS OF WESTERN AUSTRALIA  
PORT OF ESPERANCE  
LOCALITY PLAN AND SERVICES DATA

APPROVED: *[Signature]* DATE: 24-11-89  
P.W.D. WA 53923-11-1

DESIGN CALC.	BOCK	DESIGN CALC.	BOCK
CHECKED	BOCK	CHECKED	BOCK
DRAWN	P.J.S.	DRAWN	P.J.S.
TRACED	CHICKED	TRACED	CHICKED
SUPERVISOR	DATE: 24-11-89	SUPERVISOR	DATE: 24-11-89
AS SHOWN			

GENERAL NOTES  
UNLESS OTHERWISE SHOWN ALL DIMENSIONS ARE IN METRES  
1. SEE DPG 53923-11-2 FOR LEASES  
2. SEE DPG 53923-11-3 FOR CROSS SECTIONS & DESIGN LOADINGS

ZONE	DATE	REVISION	FILE NO.
1	24-11-89	1	PWD 53923-11-1











## 98



INDIAN OCEAN

DATUM  
LOW FREQUENCY SWICH IS ZERO ON THE ICE GAUGE AND  
0.75" BELOW AND

THE FISHING BOAT "MARIPOSA" HAS MOVED TO 2000 LINDEN AVE. IN ALL WEATHER CONDITIONS. WORKING FACILITIES AND EQUIPMENT FOR USE BY THE COMMERCIAL FISHERY FLEET AND BOAT MEN ARE NOW AVAILABLE AND CATERED OUT BY "MARIPOSA" CHARTERS OPERATING FROM THE FISHING BOAT "MARIPOSA" (CALL) UP TO 300 TONNE CARRYING AND BOAT AT SMALL BOAT BRIDGE.

**SUPPLY**  
 SUPPLY - NO 1 SUPPLY CAN HANDLE 9975 UP TO 1000 TONS  
 DEPOSIT - NO 2 SUPPLY CAN HANDLE 9975 UP TO 600  
 TONS DISBURSEMENT

SUPPLY AND DEMAND FOR WATER AND TRANSPORT RESOURCES

FLORA, 47, WAS MARRIED IN THE SOUTH BRITANNIA BIRTH  
BOAT 2008 SOUTH BRITANNIA ETTY AND 188 ETTY. THE  
SERVICE ETTY WAS GENERAL. (BORN JULY 20, 1888) WAS  
440 V. 2018 AND 04 SMALL MALE, 200 V. 2018 ETTY ARE  
PRODUCED AT THE NORTH BRITANNIA ETTY, SOUTH BRITANNIA  
WARRS AND 188 ETTY.

SUPREMACY - PUBLIC WORKS DEPARTMENT OF U.S. ARMY  
FISHING BOAT - DEPARTMENT OF MARINE AND RESOURCES

RELATING TO THIS AREA CAN BE OBTAINED FROM THE AUSTRALIAN  
BUREAU OF METEOROLOGICAL CLIMATIC SURVEY - WESTERN  
AUSTRALIA.

THIS LABOR IS UNDER THE OPERATIONAL CONTROL OF THE  
PRELIMINARY PORT AUTHORITY TO WHOM REQUESTS SHOULD BE  
DIRECTED

UNLESS OTHERWISE SHOWN ALL DIMENSIONS ARE IN METERS

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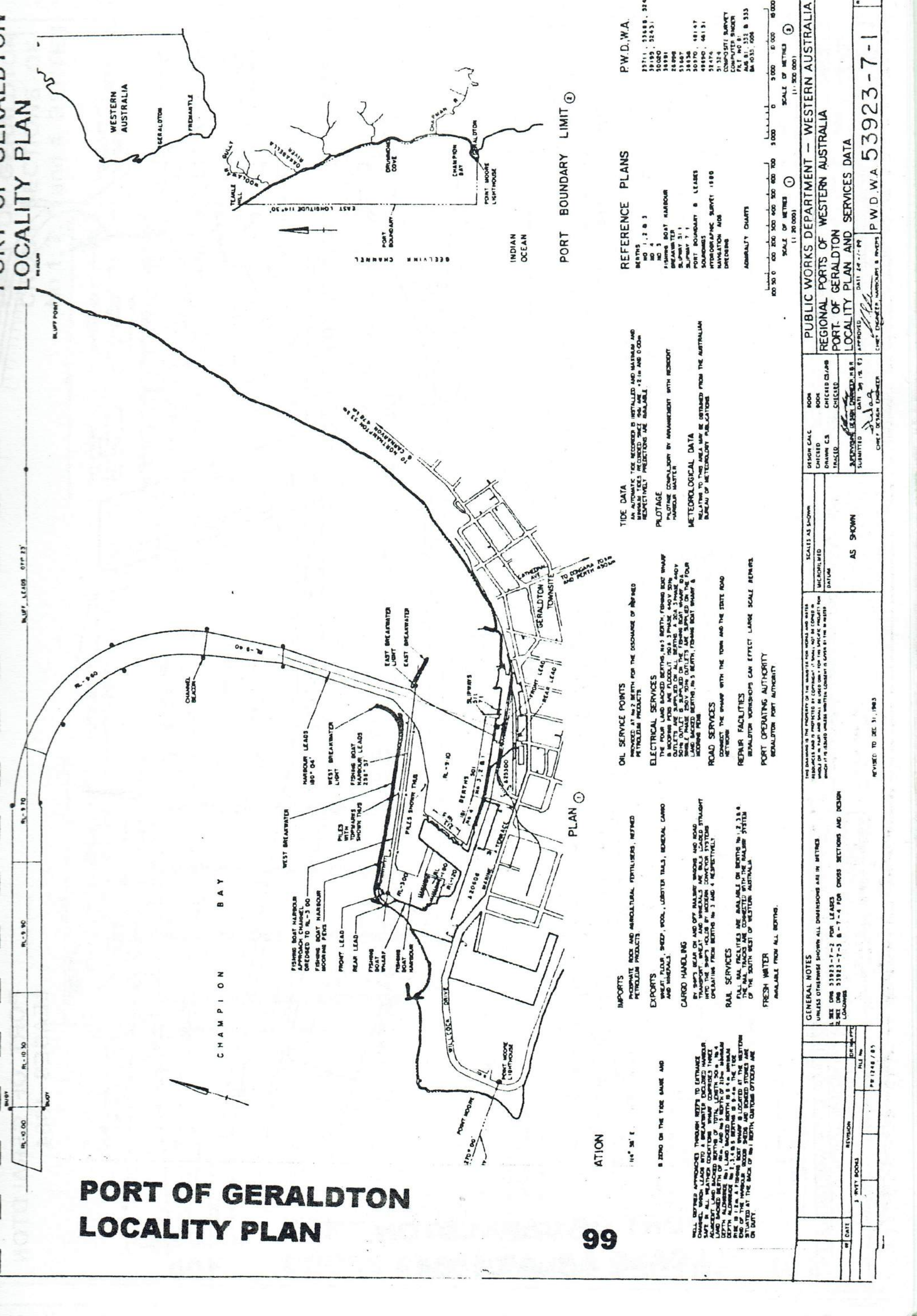
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PLAN  
①

SCALE OF METERS  
(1:10,000) ①

(11-0000)





# PORT OF GERALDTON LOCALITY PLAN

IMPORTS

PHOSPHATE ROCK AND AGRICULTURAL FERTILISERS, REFINED PETROLEUM PRODUCTS

EXPORTS

WHEAT, FLOUR, SHEEP, WOOL, LOSTER TAILS, GENERAL CARGO AND MINERALS

CARGO HANDLING

BY SHIP'S BARGE ON AND OFF RAILWAY WAGONS AND ROAD TRANSPORT. WHEAT AND MINERALS ARE BARGE LOADED STRAIGHT INTO THE SHIP'S HOLD BY REVERSE CONVEYOR SYSTEMS. OPERATION FROM BERTHS NO. 3 AND 4 RESPECTIVELY.

RAIL SERVICES

FULL RAIL FACILITIES ARE AVAILABLE ON BERTHS NO. 1, 2, 3 & 4. THE RAIL TRACKS ARE CONNECTED WITH THE RAILWAY SYSTEM OF THE SOUTH WEST OF WESTERN AUSTRALIA.

FRESH WATER

AVAILABLE FROM ALL BERTHS.

OIL SERVICE POINTS

PROVIDED AT NO. 2 BERTH FOR THE DISCHARGE OF REFINED PETROLEUM PRODUCTS

ELECTRICAL SERVICES

THE FOUR LAND BACKED BERTHS NO. 1, 2, 3 & 4 HAVE 200V 50Hz AC SUPPLY. 200V 50Hz AC SUPPLY IS ALSO AVAILABLE ON THE FISHING BOAT HARBOUR. A 20A 3 PHASE 400V 50Hz AC SUPPLY IS AVAILABLE ON THE FISHING BOAT HARBOUR. A 20A 3 PHASE 400V 50Hz AC SUPPLY IS ALSO AVAILABLE ON THE FISHING BOAT HARBOUR. A 20A 3 PHASE 400V 50Hz AC SUPPLY IS ALSO AVAILABLE ON THE FISHING BOAT HARBOUR.

ROAD SERVICES

CONNECT THE WHARF WITH THE TOWN AND THE STATE ROAD NETWORK.

REPAIR FACILITIES

REPAIR WORKSHOPS CAN EFFECT LARGE SCALE REPAIRS.

PORT OPERATING AUTHORITY

GERALDTON PORT AUTHORITY

TIDE DATA

AN AUTOMATIC TIDE RECORDER IS INSTALLED AND MAXIMUM AND MINIMUM TIDES RECORDED SINCE 1964 ARE +2.1m AND 0.00m RESPECTIVELY. PREDICTIONS ARE AVAILABLE.

PLOTTAGE

PLOTTAGE COMPANION BY ARRANGEMENT WITH RESIDENT HARBOUR MASTER.

METEOROLOGICAL DATA

RELATING TO THIS AREA MAY BE OBTAINED FROM THE AUSTRALIAN BUREAU OF METEOROLOGICAL PUBLICATIONS.

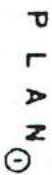
REFERENCE PLANS

BERTHS NO. 1, 2 & 3 NO. 4 NO. 5 FISHING BOAT HARBOUR BREAKWATER SLIPWAY 31.1 SLIPWAY 7.1 PORT BOUNDARY & LEASERS SOURCES HYDROGRAPHIC SURVEY 1980 NAVIGATION AIDS DREDGING ADMIRALTY CHARTS

ADDITIONAL CHARTS

25711, 25688, 25689, 25690, 25691, 25692, 25693, 25694, 25695, 25696, 25697, 25698, 25699, 25700, 25701, 25702, 25703, 25704, 25705, 25706, 25707, 25708, 25709, 25710, 25711, 25712, 25713, 25714, 25715, 25716, 25717, 25718, 25719, 25720, 25721, 25722, 25723, 25724, 25725, 25726, 25727, 25728, 25729, 25730, 25731, 25732, 25733, 25734, 25735, 25736, 25737, 25738, 25739, 25740, 25741, 25742, 25743, 25744, 25745, 25746, 25747, 25748, 25749, 25750, 25751, 25752, 25753, 25754, 25755, 25756, 25757, 25758, 25759, 25760, 25761, 25762, 25763, 25764, 25765, 25766, 25767, 25768, 25769, 25770, 25771, 25772, 25773, 25774, 25775, 25776, 25777, 25778, 25779, 25780, 25781, 25782, 25783, 25784, 25785, 25786, 25787, 25788, 25789, 25790, 25791, 25792, 25793, 25794, 25795, 25796, 25797, 25798, 25799, 25800, 25801, 25802, 25803, 25804, 25805, 25806, 25807, 25808, 25809, 25810, 25811, 25812, 25813, 25814, 25815, 25816, 25817, 25818, 25819, 25820, 25821, 25822, 25823, 25824, 25825, 25826, 25827, 25828, 25829, 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# PORT OF GERALDTON LEASE AREAS 1984

100

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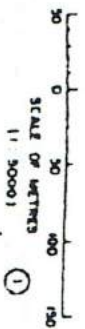
GENERAL NOTES  
UNLESS OTHERWISE SHOWN ALL DIMENSIONS ARE IN  
FEET AND INCHES - 1" = 1' FOR LOCALITY PLANS

With the coming of the electronic age, the use of electronic computers and magnetic storage and is restricted to the computer. It is not the case of the computer which can be used to store data for the entire life of the computer. The computer is not the only device which can be used to store data. The computer is not the only device which can be used to store data.

SCALAS AS SHOWN	DESIGN CALC	BOOK
MICROMETER	CHECKED	BOOK
DATUM	DRAWING	CHECKED C/AS
CHART DATUM WHICH IS ZERO ON THE TIDE GAUGE AND 0.84 IN BELOW AND	TABLED	CHECKED
MATERIALS BY JOHN DECKARD HIR SUBMITTED DATE 29 12 37 100.		

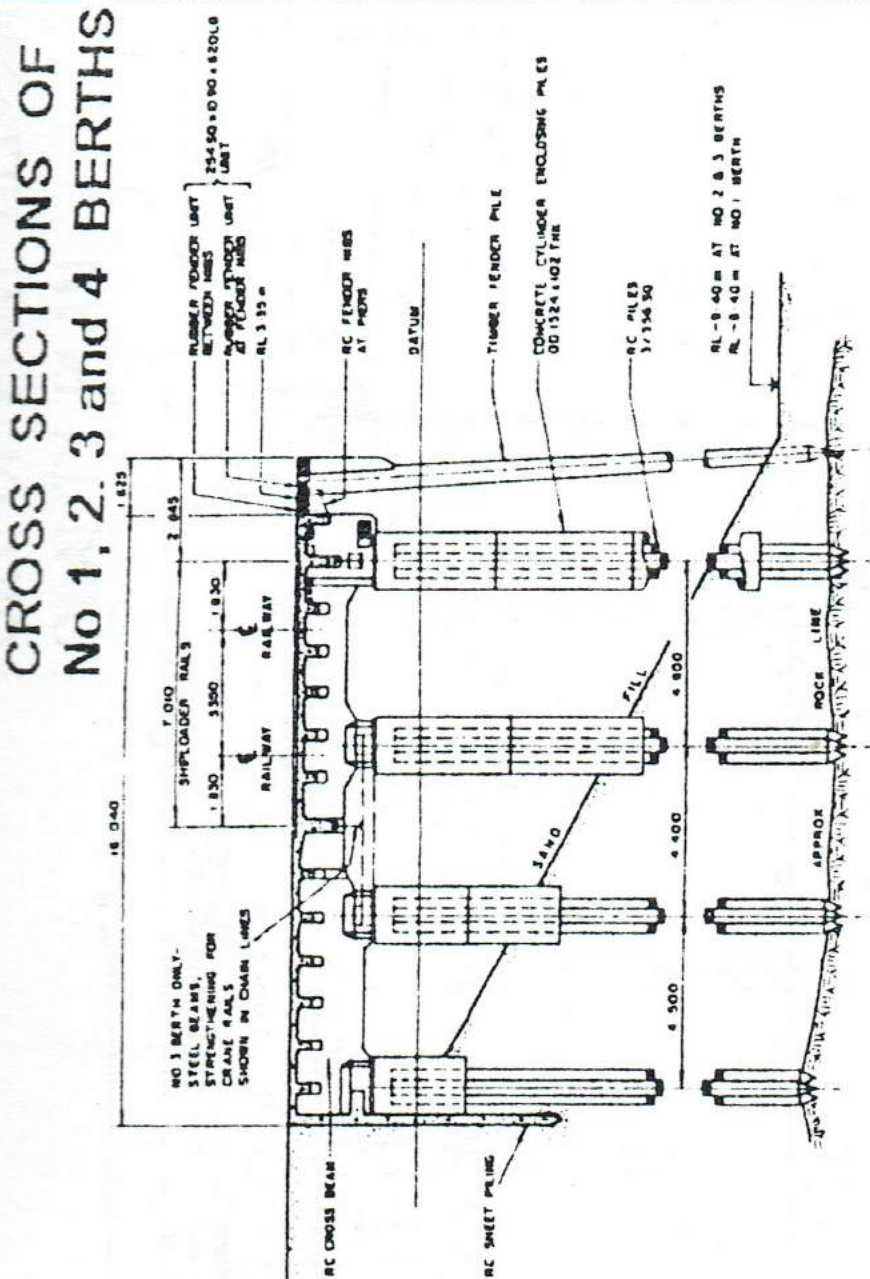
PUBLIC WORKS DEPARTMENT - WESTERN AUSTRALIA  
REGIONAL PORTS OF WESTERN AUSTRALIA  
PORT OF GERALDTON  
LEASES

LOWNA 53923-7-2





# PORT OF GERALDTON CROSS SECTIONS OF No 1, 2, 3 and 4 BERTHS

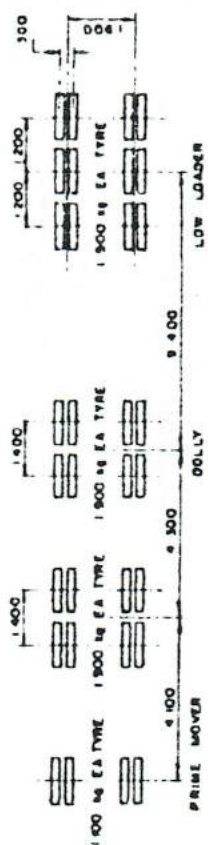


No 1, 2 & 3 BERTHS -

TYPICAL CROSS SECTION

DESIGN LOADINGS ON APPLICATION TO CHIEF  
ENGINEER, HARBOURS AND RIVERS, P.W.D.  
(PIERS AT 8.095 CENTRES)

20 TONNE LOW LOADER, AGGREGATE TYRE LOADS SHOWN

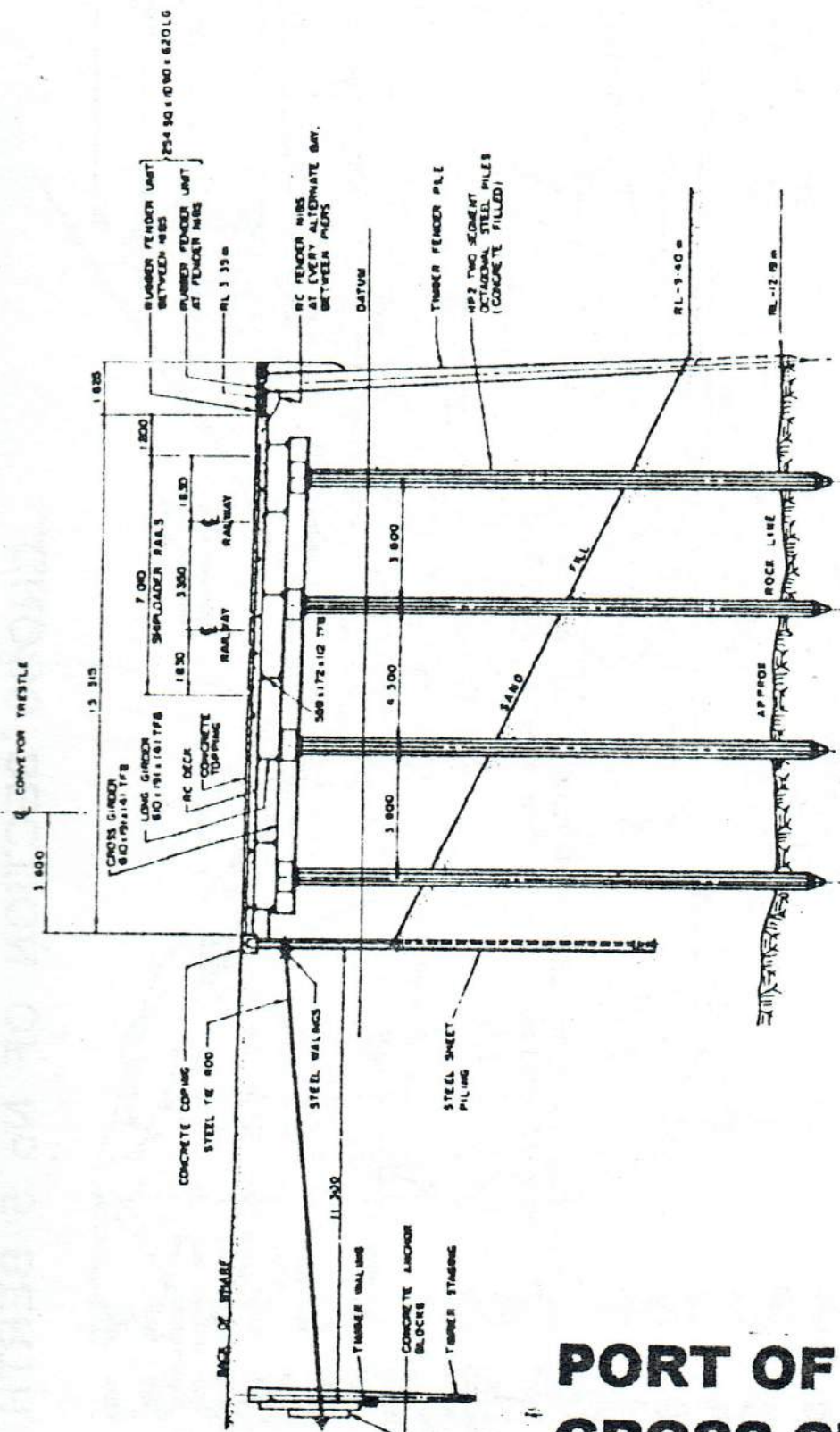
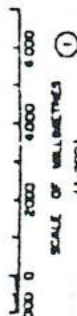


(E) STANDARD TRUCK LOADING

BERTH DESIGNED FOR STANDARD 18 TONNE TRUCK  
(114 TONNE AGGREGATE LOADS ON DUAL WHEEL FENDER AXLES)

(F) BERTHING LOAD

20 000 TONNE VESSEL (LOADED DISPLACEMENT MASS) AT 0.15 m/s<sup>2</sup> - 50 % KINETIC ENERGY  
ABSORBED BY STRUCTURE



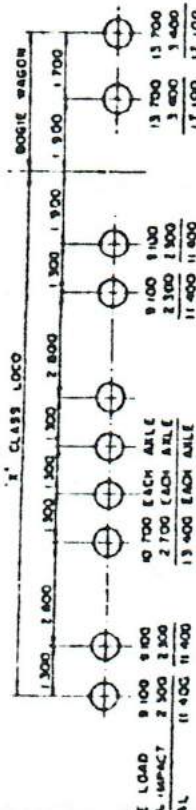
No 4 BERTH -

TYPICAL CROSS SECTION

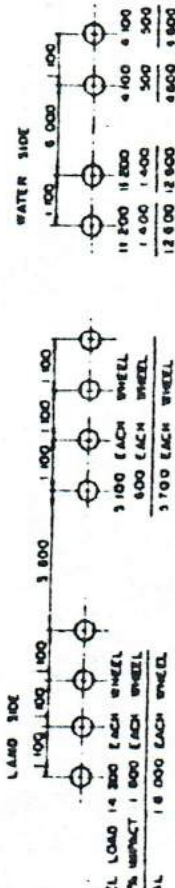
DESIGN LOADINGS ON APPLICATION TO CHIEF  
ENGINEER, HARBOURS AND RIVERS, P.W.D.  
(PIERS AT 7.010 CENTRES)

LOADINGS ON No 4 BERTH

ACKNOWLEDGEMENTS  
SHAW GROUP - 3,400 kg/m<sup>2</sup>  
BACK OF SHAW - 4,900 kg/m<sup>2</sup>  
ILWAY LOADS (kg)

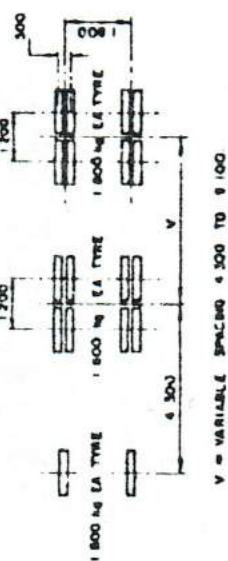


LINE AND SHIPLOADER LOADS  
HOME GALLERY (ESTIMATED LOADS - kg)



(D) HEAVY ROAD VEHICLES

21 TONNE SEMI-TRAILER AGGREGATE TYRE LOADS SHOWN



V = VARIABLE SPACING 4 500 TO 8 100

GENERAL NOTES

UNLESS OTHERWISE SHOWN ALL DIMENSIONS ARE IN MILLIMETRES  
1. SEE DRG 53923-7-1 FOR LOCALITY PLAN

THE DRAWING IS THE PROPERTY OF THE PORT OF GERALDTON AND WATER  
RESOURCES AND IS NOT TO BE REPRODUCED OR TRANSMITTED IN ANY  
FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING  
PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE  
RETRIEVAL SYSTEM, WITHOUT PERMISSION IN WRITING FROM THE  
PORT OF GERALDTON AND WATER RESOURCES.

CHART DATUM WHICH IS ZERO  
ON THE TIDE GAUGE AND  
0.847m BELOW AND

DESIGN CALC.  
CHECKED  
DRAWN  
REVISION  
DATE  
SUBMITTED  
DATE  
APPROVED  
DATE  
CHIEF ENGINEER

PUBLIC WORKS DEPARTMENT - WESTERN AUSTRALIA  
REGIONAL PORTS OF WESTERN AUSTRALIA  
PORT OF GERALDTON  
CROSS SECTIONS AND DESIGN LOADINGS

REVISION TO DEC 31, 1983

CHIEF ENGINEER

APPROVED  
DATE  
CHIEF ENGINEER

P.W.D. W.A. 53923-7-3







# PORT OF PORT HEDLAND LOCALITY PLAN



1. DRESSER
2. LEAVE SALT CO
3. MOORE OIL MUST LTD
4. AMPOIL PETROLEUM LTD
5. BP MUST LTD
6. GOLDEN FLEECE PETROLEUM
7. CALTEX OIL (MUST) PTY LTD
8. SHELL CO OF AUSTR LTD
9. P 80 MUST LTD
10. SEARUNER 3 CENTRE
11. BRANBLEY HOLDINGS LTD

FOR OTHER LEASES NOT SHOWN ON DRG. SEE  
PORT HEDS AND PORT AUTHORITY W.A. ANNUAL REPORT

34° 3' N, 108° 34' E

[illegible]

PETROLEUM PRODUCTS &amp; GENERAL CANNED.

**EXPORTS**  
MINERAL ORES OF IRON, MANGANESE & COPPER, SALT, WOOL  
AND SKINS

**FRESH WATER**  
AVAILABLE AT No. 1 & No. 3 BERTHS.

**OIL SERVICE POINTS**  
PROVIDED FOR ALL FUEL OIL PRODUCTS FROM No. 1 & No. 3 BERTHS.  
(POWER OILS FROM No. 2 BERTH, OREGONIAN ONLY)

AVAILABLE AT \$100.00 3 MONTHS

PROVIDED FOR PETROLEUM PRODUCTS FROM No. 1 & No. 3 DISTRICTS  
(BLANDFORD FROM No. 1 DISTRICT DISTRICT ONLY)

**ELECTRICAL SERVICES**  
POWER AND LIGHTING SUPPLY AT 440/230V 50HZ FLOOD LIGHTING  
3 PHASE 400V 50 HZ POWER OUTLETS 30A 3 PHASE 400V 50 HZ  
OUTLETS AND 600V SINGLE PHASE 250V 50 HZ OUTLETS  
INSTALLED ALONG BERTH GALLEY 30A 3 BERTH HAS 30A 3 PHASE  
440V 50 HZ POWER OUTLET SOCKETS INSTALLED ALONG BERTH  
GALLEY POWER IS AVAILABLE CALLED AT NIGHT IS POSSIBLE BY  
SPECIAL ARRANGEMENT WITH THE MARINE MASTER

ROAD ACCESS PROVIDED TO BOTH SIDINGS.

PORT HEDLAND PORT AUTHORITY.

AN AUTOMATIC FIRE ALARM IS INSTALLED. PREDICTIONS ARE UNAVAILABLE.

**PILOTAGE**  
PILOTAGE COMPANIES BY ARRANGEMENT WITH RESIDENT

METEOROLOGICAL DATA  
 RELATING TO THIS AREA MAY BE OBTAINED FROM THE AUSTRALIAN  
 BUREAU OF METEOROLOGY PUBLICATION: CLIMATIC SURVEY  
 - NORTHWEST REGION 6 - WESTERN AUSTRALIA

**Maple Security**

NO. 1 BIRTH  
NO. 3 BIRTH  
CHANNEL AND BIRTH SOUNDINGS (1973)  
HYDROGRAPHIC SURVEY (1973) COMPARISON!  
FUTURE PORT DEVELOPMENT  
PORT BOUNDARY  
LEASES WITHIN PORT BOUNDARY  
NAVIGATION AIDS  
NONALLOY CHANNELS

47025  
43716  
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48236  
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39148  
42082  
44165  
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GENERAL NOTES  
UNLESS OTHERWISE SHOWN, ALL DIMENSIONS ARE IN METERS

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PUBLIC WORKS DEPARTMENT -  
REGIONAL PORTS OF WESTERN AUSTRALIA  
PORT OF PORT HEDLAND  
LOCALITY PLAN AND SERVICES DATA

APPROVED	DATE 10-1-74
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FWO, W.A.J.

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# **THE NEXT TWENTY YEARS**

## **SECTION TWO**

### **THE YEARS BEFORE AND THE TRANSITION PERIOD**



## THE NEXT TWENTY YEARS

### The Demise of the Public Works Department

On the 15th January 1948 I joined the Public Works Department of Western Australia as a graduate engineer on one years probation.

On the 25th January 1985, with the disintegration of the Public Works Department, the position that I had occupied for 13 years as Chief Engineer, Harbours and Rivers, was abolished and I was transferred (without portfolio) to the Department of Marine and Harbours.

Early in 1986, about six months before my 60th birthday I was forced into retirement, joining the ranks of many other senior civil servants, who were likewise disposed of during the reign of the Burke Government, so ending my 38 year career as a professional engineer in the State Civil Service, (1)

The first 17 years of my time with the Public Works Department had been spent in fieldwork, having been based at Albany, Collie, Katanning, Harvey, Lake Grace, Dalwallinu, Morawa, Bunbury, Merredin and Derby. (2)

(1) - In 1987, Mr. Mensaros MLA, the Member for Floreat and the Shadow Minister for Works in the Coalition Opposition, in his address in reply spoke on the Politicising of the Public Service and drew attention to a number of senior officers of the Public Service who had been removed from their position by the Burke Government. These included Dr Robert Vickery, Ken Cadee, Bruce Beggs, Les McCarrey, Clive Gordon, Jerry Bateman, Ernie Barker, Max Anderson, Pat Shaddick, Noel Fitzpatrick, Ken McKenna, Noel Semmens, Len Hitchen, Bob Davies, and Bill Kidson.

(2) This time together with three years or parts thereof, which I spent during my training period, prior to joining the PWD, has been covered in previous



*to joining the PWD, has been covered in previous unpublished memoirs entitled " Twenty Years in the Field Engineering Anecdotes from the mid 40s to the mid 60s."*

Over those years I had occupied various positions in some of the branches and sections of the Public Works Department and which included the Country Water Supply, the Goldfields Water Supply, Irrigation and Drainage, Construction, North West and Harbours and Rivers.

My last field job was the building of a new jetty at Derby, which eventually suffered the same fate as the Public Works Department.

## **Departure from Derby**

On the 14th October 1965 the Derby Jetty was officially opened by the Minister for Works and Water Supplies, the Hon Ross Hutchinson D.F.C., M.L.A.

On the 15th October 1965, after having previously sold our furniture and Elsa's much loved Austin A 30, and having arranged for the fifth member of our family, our faithful Labrador cross Ricky to be consigned to Perth on the next available freight plane, Elsa, Yvette, Gregory and I boarded RMA "Swan" for our last trip south from Derby.

## **Attadale**

On my transfer from the Goldfields Water Supply Branch at Merredin to the North West Branch at Derby in 1960, I was told that my time at Derby would be no longer than four years. During the ensuing period several changes were made to the Engineering Division of the Public Works Department resulting in the closure of the North West Branch and the transferring of its officers to other branches. Prior to these changes I had been seconded to the Harbours and Rivers branch as Resident Engineer on the building of the new Derby jetty but still retaining some of my duties as Resident Engineer for the North West. On the



demise of the North West Branch I was transferred to the Harbours and Rivers Branch, on the understanding that I would be moved to Perth on the completion of the building of the Derby Jetty.

During our holiday south from Derby in 1964, Elsa and I decided that we should purchase a house somewhere in the Perth area so that we would at least have somewhere to live when we were eventually transferred to the metropolitan area. We felt that we should look for something south of the river so as not to be too far way from my parents who were living in East Fremantle and Elsa's father and brother who were living at Kenwick. I also visualised that I would most likely be transferred to Fremantle Harbour Works so that a place somewhere in the Melville area would be an advantage in being close to my work.

In the end we settled for Attadale where we bought a place, practically devoid of any garden, on the corner of Kingsall and Bricknell Roads for the princely sum of 5,750 pounds ((\$11,500). It was a fairly standard brick and tiled house, three bedrooms, one bathroom, a laundry and a toilet, an L shaped lounge and dining area with a small kitchen. It was certainly much bigger than the only other house, which we had bought, which was in Caw Street, Merredin, in 1957. Before returning to Derby we made arrangements with George Mitchell, the agent who sold us the house, to rent it out on a short-term basis.



*38 Kingsall Road, Attadale on the corner of Kingsall and Bricknell Roads taken a few years after we had moved in*



On 15th October 1965, after five and a quarter years in Derby, we were transferred to Perth, having made previous arrangements with our agent to have the house vacated. Prior to leaving Derby we had sold all our furniture, with the view of buying new furnishings once we got to Perth. Unfortunately, we did not have a lot of initial time to set up our new home, as I had to report to Perth Office, not Fremantle Harbour Works, almost the day after we arrived. We did, however, manage to purchase some essentials, such as a refrigerator, a double mattress, two single mattresses and a TV set, the latter which was set up in a prominent position in the lounge. At that time it was necessary to license both radios and TVs. The regulations were strict. If the set was not licensed, one was fined. Inspectors would patrol the streets looking for culprits. On about the 17th October 1965, a TV inspector patrolling the back streets of Attadale found four such culprits watching TV, (a rare treat for four TV starved ex Derbyites) in a very sparsely furnished house on the corner of Kingsall and Bricknell Roads.

In our haste in setting up the TV I had forgotten to call in at the Post Office to register the set. After some fast-talking, although it was quite obvious by the lack of other furniture, I explained that we had just moved in. I was let off with a caution.

Eventually we were able to complete the furnishings, plant some lawn and settle down into a completely new life style - Yvette and Gregory commencing a school where all the faces were white; Elsa, enjoying the large displays of dress materials, fruit and vegetable and no longer having to worry about the perishable subsidy and myself now having to wear a tie and join that large crowd of people in head office, referred to by all field staff as "They".

## **The Public Works Department.**

In my early years with the Department I use to make several one or two day visits to the old Barracks buildings, which housed the Public Works Department, the Metropolitan Water Supply, Sewerage and Drainage Department and part of the Main Roads



Department. These visits were quite short as I always felt that head office staff was not keen to have their field staff spending too much time in Perth, in case they got to like the city lights too much.

The Barracks, of which only the central arch section remains today, was completed in 1866 to house the enrolled pensioner force and their families. It comprised two symmetrical three storied wings on each side of the central arch.

A family apartment consisted of two rooms, one, or sometimes both, with a fireplace, and with access to the rooms being off a wide verandah running along the back of the building. From 1900 to 1904 the building was gradually converted into offices for the Public Works Department. (3)

One of my early impressions of the offices was this abundance of fireplaces. Nearly every office had one. On the few times I visited the offices in the winter I was very much aware how warm and inviting the rooms were with a blazing log fire burning in the open brick fireplace.

And now I was to become a part of "Head Office", the place from which "They" operated, from where everything was authorised, "stamped" and approved, from where all instructions originated and from where all directions were given. This was where the important decisions were made, where movements of field staff were decided and where solutions were found to all those minor problems facing field engineers.

And on the 15th October 1965 or thereabouts I joined "Them", as a level three engineer, which was the same grade I had been on at Merredin and Derby.

*(3) John Le Page – Building a State – The story of the Public Works Department of Western Australia – 1829-1985*



## Harbours and Rivers Branch

My introduction to the Harbours and Rivers Branch of the Department was at the end of my first year at University in 1944 when I spent my vacation at Fremantle Harbour Works on a weekly wage, after paying a penny stamp duty, of 19/11 (just under \$ 2). At that time head office staff, as I recall consisted of the Engineer for Harbours and Rivers, Mr. Stevenson Young, his chief clerk George Bell and one other clerical assistant. The other engineers were based at Fremantle Harbour Works and included The Resident Engineer, Cyril Morgan, his assistant engineers, Norm Henry, John Gillespie, Avery Haines and Malcolm McCleery.

In 1965 I became one of the assistant engineers in head office. The Engineer for Harbours and Rivers was Norm Henry, who retired later that year whilst John Gillespie was his Principal Assistant Engineer. Eddie Gorham was the Senior Engineer.

The other level three engineers were Jim Butcher, Max Thorbjornsen and myself. Trevor Leaver, a level two engineer at that time was Resident Engineer at Bunbury Harbour Works, a position which I had occupied prior my transfer to the Goldfields Water Supply at Merredin in 1957.

George Bell, who had Joined the branch in 1926, the year I was born, and whom I had first met in 1944, was the Senior Clerk. One of the problems in any office is the retrieval of stored material, and even with computerised offices today, this is still a problem. We were fortunate in having an officer like George Bell who at a moment's notice could put his hands on any filed information required. I know that as the "new boy" on the scene, I found him most invaluable.

Following on from the retirement of Norm Henry in November 1965, there were several changes made in the branch. John Gillespie was appointed to the position of Engineer for Harbours and Rivers, Eddie Gorham, who was the Senior Engineer was moved into the office of the then Director of Engineering, John Parker, as an Executive Engineer and Keith Steere, who had previously been the



Engineer for the North West Branch was moved from the Director's Office to the Harbours and Rivers Branch as Executive Engineer to John Gillespie and I was promoted from a level 3 engineer to Senior Engineer, Harbours and Rivers.

### **Norm Henry**

Apart from the normal office farewells in Perth, Norm Henry decided that he should do one last trip through the North before he retired, and that I, who had now spent some time in the area should accompany him. We were away about two weeks visiting Wyndham, Derby, Broome, Port Hedland, Point Samson, Dampier, Onslow and Cararavon.

There were two incidents I remember well. The first one was our visit to Dampier where Central Engineering Services Pty. Ltd. had commenced the construction of the iron ore export port for Hamersley Iron Pty Ltd and the whole area was a hive of activity

That evening, back in our motel room, we were discussing various aspects of the works we had inspected that day. Norm asked me a leading question as to what would be the main change I would make, if I were in charge. I gave it some thought and started to elaborate on the pile driving procedures.

Norm interrupted me, saying that, that could be a point but he felt that the biggest change he would make if he were in charge would be to sack the cook. I had to agree that those greasy meatballs we attempted to digest in the camp mess. at lunch that day were not the best.

The second incident was in our shared motel room at the Pier Hotel in Port Hedland. After quenching our thirst, many times over, Norm started to reminisce on different incidents in the department. Norm had the reputation of being a pretty strict boss and did not tolerate any nonsense or any back chat.

He also insisted that all staff were addressed as Mr. by their juniors. We often would muse on -what would have happened if Mr. Henry, the boss had met up with Norm Henry, the young engineer. In his earlier days he was often referred to as the "black



bastard", partly because of his dark eyes and the fact that he always seem to support a five o'clock shadow, even after he had shaved. Having had a few more drinks than normal I decided to recount an incident at Bunbury, where I was Resident Engineer in the mid 50s, over which I gained the full wrath of Mr. Henry.

At the time, we were dredging the harbour between the timber Jetty and the breakwater, using the cutter suction dredge "Governor" and discharging through a floating pipeline to reclamation along the inside of the breakwater. It was a bitterly cold wet July day, with a strong onshore breeze. Both Mr. Henry and I were standing on the Jetty, bracing ourselves against the wind and pounding rain, waiting for the launch "Melville" to pick us up and take us out to the dredge. In the course of setting off from the dredge, the launch driver Bunny Rule managed to wrap one of the pipeline moorings around the propeller. And there he was stranded a few yards out from the Jetty and there we were stuck in the pouring rain on the Jetty.

Mr. Henry was not pleased. I was far from happy. I then made some comment along the lines that I had certainly messed up this one. And then it started. It came down heavier than the rain. Norm called me everything -he told me that I should have never taken up engineering - that I was a complete failure - I couldn't organise a lumper's picnic (although that one was beyond me)- and quite a few other comments, which through time I have since forgotten.

Having recounted all this to Norm, whilst sitting on our beds in the hotel, I then added - you were certainly a black bastard then. I will never forget Norm's reaction. He looked at me and said in quite hushed tones - "Max! Did I really act like that? If I did I am certainly sorry. I would have never intended to upset you like that."

. Then his face brightened up and he said "Well may be I did, but you must admit that I would have done it for your own good. Look where you are now. After Gillie (John Gillespie) retires you will no doubt get his Job and be the next Engineer for Harbours and Rivers - (Chief Engineer) after him. You must agree that the dressing down I gave you if I did, hasn't done you any



harm." He then added. "And don't keep calling me Mr. Henry "(which I had for the last 20 years I had known him) - My name is Norm."

I might add that after that incident we cemented a wonderful friendship, which lasted up to the time of his death in 1980.

Another one of the stories associated with Norm Henry was his tendency to speak very loudly on the telephone, particularly if he was giving someone a blast. One of the field engineers, Ralph Schrauf, would delight in making out that it was a bad line, causing Norm to speak even louder on the phone. His voice would reverberate through several rooms in the office, much to the amusement of some of the staff.

Norm was also a very determined boss and did not like being distracted when he was ticking someone off. In the early 1950s Ed Gorhan was the Resident Engineer at Albany Harbour Works. On one particular day Norm was holding forth with Eddie in the harbour works office on some work procedure, on which he was not in agreement,

It was just prior to lunchtime and the one-way argument was becoming quite heated. Eddie suddenly realised that his wife Betty was due call into the office at any time to pick up his car and he did not want her to arrive at the office in the middle of the tirade into which the discussion was now developing. Just in time he managed to get the message across to Norm that his wife would be arriving at the office at any moment and could they defer the discussion until after she had left. Norm agreed to this, and the conversation was changed to some other less pressing items until Betty arrived, greeted Mr. Henry, who was most charming, picked up the keys to the car and departed. Ed thought that, that would be the end of the argument. It was not. As soon as Betty was out of earshot Norm resumed his previous somewhat belligerent manner and continued to tear strips of Eddie for his misdemeanors.

I think that most of Norm's staff ran foul of him at some stage or other. However, in spite of all this we still reckoned that he was a good boss.



## John Gillespie

During my career I had much more to do with John Gillespie than with Norm Henry. I had met him first at Fremantle Harbour Works in 1944, where I spent my vacation at the end of my first year at university learning all about lead lines, hot tar and pile driving. I was his assistant engineer at Bunbury Harbour Works in 1953, prior to his transfer to Perth. I also dealt with him directly on the construction of the Derby Jetty in 1963 and 1964.

I also became heavily involved with John in the planning of the new inner harbour at Bunbury. Whilst he was at Bunbury and while in Perth office he had put forward several proposals to his immediate boss, Norm Henry for the construction of a new inner harbour at Bunbury.

Although the proposals were not new, they were a great improvement on previous plans to develop a land locked harbour within the lower part of the Leschenault Estuary. For one reason or other Norm was not receptive to these proposals and the rough drawn plans, complete with some preliminary ground information and other relevant details were confined to a bottom drawer of one of the plan cabinets in head office.

It was not until 1966, after Norm's retirement and John had taken over from him as Engineer for Harbours and Rivers, that these plans saw daylight again. Planning then commenced in earnest to build an inner harbour at Bunbury as it exists today.

I gathered that Norm and John were not always in agreement on some of the construction procedure. I remember one case concerning the method to be used for pile driving in the reconstruction of the Wyndham Meatworks jetty in 1960. Two methods were being considered. One method was to cantilever the pile frame out from the Jetty structure and drive piles from topside, The other one was to use a pile frame mounted on a barge and drive piles from the water.

Both methods had their problems. With the cantilever system, the top structure would have had to



be practically completed and/ or else sufficiently strengthened to take the construction equipment, before proceeding on to the next pier. In using floating plant, very tight control of the barge operating in the strong tidal currents in Cambridge Gulf would be required.

The story I was told was that John preferred using floating plant, but feared that he would be overruled by his immediate boss Norm who would insist that the pile driving be done from topside. John therefore suggested that the piles be driven using a cantilever off the existing strengthened Jetty. Much to his relief, Norm disagreed and stated that the piles would be driven from floating plant. This pleased both of them, even although Norm never understood why John thanked him.

## **Malcolm McCleery**

Another engineer with whom I had a long association was Malcolm McCleery, whom I first met at Fremantle Harbour Works at the end of 1944. Malcolm was in his first year out of University and-I was doing my first vocational Job at the, end of my first year at University.

During my engineering career, I made many country moves, but only three as a married man. The first move was from Bunbury to Merredin, the second from Merredin to Derby and the third from Derby to Perth.

The move from Bunbury to Merredin was the most difficult one, as it was nearly three months after my move from Harbours and Rivers at Bunbury to the Goldfields Water Supply Branch and whilst I was still on long service leave. that I found out in which town along the Goldfields line, I would be located. (4)

When I did find out we had to find our own accommodation. It was also made very clear to me by my new immediate superior Reg Keating, that he was not interested in my marital status,

(4)           Refer to "Twenty Years in the Field " MG  
Anderson - 1995 -Ch 11



The Goldfields Water Supply Branch did not provide a housing at Merredin for its District Engineer and it was up to me to find my own house. In the end, after six months, with Elsa and our baby daughter Yvette staying with Elsa's mother at Kenwick and myself staying at one of the Merredin Hotels, we managed to buy a house in Caw Street, South Merredin.

The move from Merredin to Derby was very different. My introduction to the North West Branch of the Department was through Malcolm McCleery, who was then the Senior Engineer of that branch. Apart from being provided with a partly furnished departmental house, I was given every assistance by Malcolm in making a smooth transition from Merredin to Derby.

One thing I remembered well was being given a list by Malcolm of most of the Derby residents, detailing, who they were, where they worked, the wife's name and the number of children they had. In retrospect this may not sound very important but at the time it gave us the start of a wonderful social life at Derby.

Of all the engineers under whom I worked, during my 38 years in the Public Works Department, Malcolm McCleery stood out to me to be one of the most helpful, obliging and understanding. It is also sad to relate that Malcolm became a victim of that fateful cancer, mesothelioma, only a few years after he had retired, believed to be the result of being exposed to asbestos during the odd times he spent in Wittenoom and Point Samson.

### **Jim Butcher**

Unlike me, Jim had spent all his working life in the Harbours and Rivers Branch of the Public Works Department. Although he was very quiet and reticent he was an excellent engineer, both technically and practically. In 1960, when I moved to Derby, Jim was the Resident Engineer on the Wyndham Jetty reconstruction. Past practice had been for construction jobs to close down during the wet season.



In the case of Wyndham, work carried on through the wet season. Working conditions were very trying, particularly on those days of high humidity, when the temperature would hit 100 degrees Fahrenheit by 7 o'clock in the morning, with a 100 % humidity and a 100 points of rain.

In those days it was hard to get men to go to Wyndham and even harder to keep them there. One of the key men on the job was the crane driver. Without him work could virtually stop. On one particular "three hundred" day, the crane driver of some three weeks in Wyndham came to Jim and told him that he was tossing in his Job in and going back to Perth. Jim, in his own quite way said, "I am not surprised. When you first arrived I could that see you would be the type that couldn't take it." This comment apparently upset the crane driver to the extent that he withdrew his resignation to prove that Mr. Butcher was wrong. Albert, the crane driver stayed on the work for the full duration of the Jetty reconstruction.

Jim was also a Justice of the Peace and would sit on the bench first thing on Monday morning to hand out sentences to those who had gone a bit wild over the weekend. One of the problems he had was that often the offenders were from the Jetty job. Labour was hard to get, particularly carpenters. They would be sent up from Perth, arrive in Wyndham, work one or two days on the jetty, succumb to the Wyndham climate, retire to Gee's Wyndham Hotel, get absolutely stoned, commit some crime, be arrested by the police and be brought before Mr. Butcher for sentencing. Jim would then have to ring up Perth again to see if two more carpenters could be sent up to Wyndham to replace the two now residing in the Wyndham Gaol.



## Wyndham Jetty Construction 1960

The driving of the steel tubular piles on the Wyndham Jetty was carried out using a 65 feet high steel pile frame, mounted on a barge. All other equipment as the boiler, piling and mooring winches was also located on the deck of the barge. The barge used at Wyndham consisted of a number of 13'6" x 5'6" x 5'6" Braithewaite boxes bolted together to form one large pontoon.

There were also a couple of sheds set up on the barge together with wire slings, mooring wires and other equipment associated with the driving of the steel piles. The deck of the barge was therefore pretty well cluttered, apart from one area on which a large red and white bull's-eye was painted. This was the "no go" area, where things like wire slings, shackles, twitches etc were dropped from the landings on the pile frame to the deck below. Jim who had a very dry sense of humour recounted to me how one morning, quite early, he had been called down to the Jetty to view, the pile driving barge which had somehow or other, overnight lost all its equipment off the deck.

The barge had been moored just off the jetty. Jim said that all that\* was left was a clear steel deck, even the painted bulls eye had been removed. Then he said that it suddenly dawned on him that, the equipment had not been stolen. It was still on the barge. It was just that the barge had flipped over 180 degrees and all the equipment and the pile frame were dangling down into the brown murky depths of Cambridge Gulf. What he was now looking at was the clean uncluttered surface of the underside of the pontoon.

This was a major catastrophe in the building of the Jetty. Apparently water had entered several of the boxes on the port side of the pontoon causing it to list to such an extent that the metacenter took over from the centre of gravity and flipped the barge over on its back. The up righting of the barge involved some very hazardous diving work in the reballasting of some of the boxes and the recovering of equipment hanging from the upturned barge.



## **The Harbour and Light Department and Port Authorities**

Prior to the demise of the Public works Department, there was a separate department under the administration of the Under Secretary for Works, known as the Harbour and Light Department. In latter years this department became the Department of Marine and Harbours before finally changing its name, as it is today to the Marine Division of the Department of Transport. The Harbour and Light Department had its own Manager and operated independently from the Public Works Department. Its main function was the administration of several Marine Acts and the operation of all the regional ports, with the exception of those ports operating under a separate Port Authority Act. It was also responsible for- pilotage at all ports excluding Port Hedland, Dampier and Fremantle. At one stage this department was responsible for the administration of nine ports, which included Wyndham, Derby, Broome, Port Hedland, Point Samson, Onslow, Carnarvon, Geraldton and Esperance.

At the same time the Harbours and Rivers Branch of the Public Works was responsible for the construction and maintenance at these nine ports.

At one stage the Harbours and Rivers Branch was also responsible for the investigation, planning and design of all State port construction and the maintenance of all such ports in the State.

This function gradually declined as ports became more autonomous with Fremantle Port Authority (Fremantle Harbour Trust), being the first port to set up its own planning and design and construction and maintenance section. This was followed in turn by the other port authorities that, although making use of the expertise of the engineers in the Harbours and Rivers Branch, engaged their own consultants and work force to carry out construction and maintenance activities within the port.



With all these changes there is still the satisfaction of knowing that the Harbours and Rivers Branch of the Public Works Department was responsible for the planning, investigation, development and improvement in no small way of all of the Government ports in Western Australia during the middle years of the last Century.



## Some of Harbors and Rivers Staff in Mid 1970s



*William Fleay \_ Resident Engineer Fremantle Harbour Works based at Fremantle Fishing Boat Harbour - responsible for maintenance and construction of estuarine and marine works throughout the metropolitan area  
Taken 1976*



*David Mosley – Senior Clerk Harbours and Rivers Branch of the Public Works Department – David eventually took over from George Bell.  
Taken in 1976*

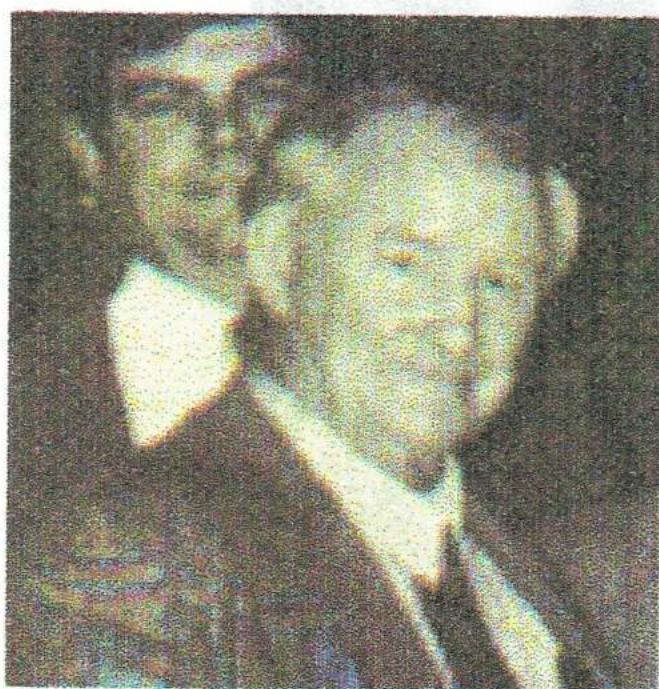


*Dr Mike Paul – Civil Engineer engaged on coastal investigations and was in charge of the survey and coastal investigations section of the Branch at Ellam Street Victoria Park. Mike succeeded me as the senior officer in charge of marine works in the Department of Marine and Harbours*





*George Bell - Senior Clerk, Harbours and Rivers Branch  
George joined the Public Works Department in 1926 as an office boy.  
Taken at his retirement function on 28 June 1976*



*Phil Aitchison – Works and Maintenance Supervisor who was based in Port Hedland.*

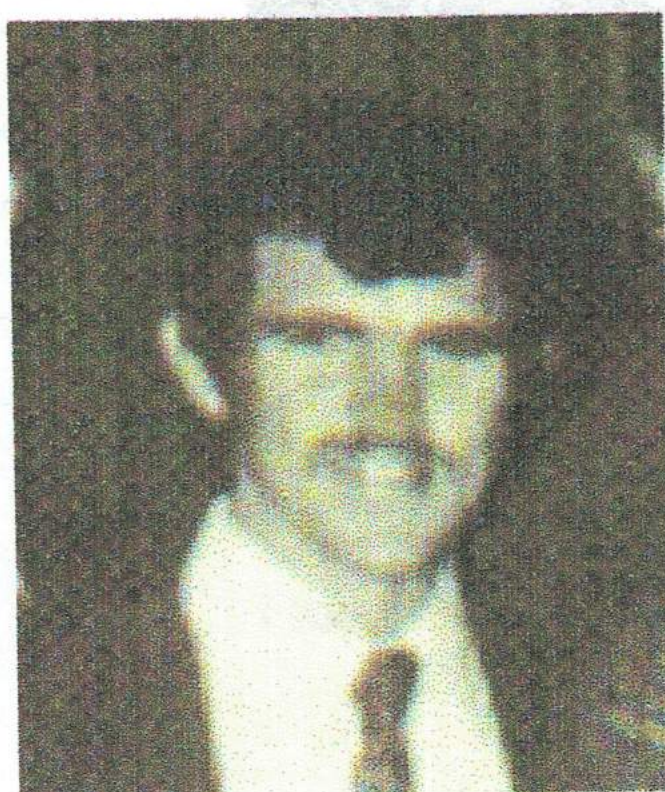


*Rod Banyard – Civil Engineer involved in planning, investigation and design of marine works  
Taken 1976*





*Max Thorbjornsen  
Civil Engineer -  
Max had been  
Resident Engineer  
at Geraldton and  
Bunbury Harbour  
Works  
Taken in 1976*



*William Till – Civil  
Engineer -  
Construction  
Bill was eventually  
transferred to the  
Waterways  
Commission being  
responsible for  
marine works in the  
Swan, Caning, Peel  
and Leschenault  
Estuaries*



*Don Wallace – Senic  
Hydrographic  
Surveyor responsible  
for surveys for port  
and harbour  
investigation and  
development,  
navigation charts and  
tidal and swell  
predictions*





*Dr William Andrew,  
Senior Engineer  
Investigation and  
Design*

*Bill was responsible  
for establishing design  
criteria and planning  
requirements for  
marine and estuarine  
structures, Bill had  
been RE at Albany*



*Ross Dawkins – Clerk  
in Charge at Fremantle  
Harbour Works  
Taken in June 1976*

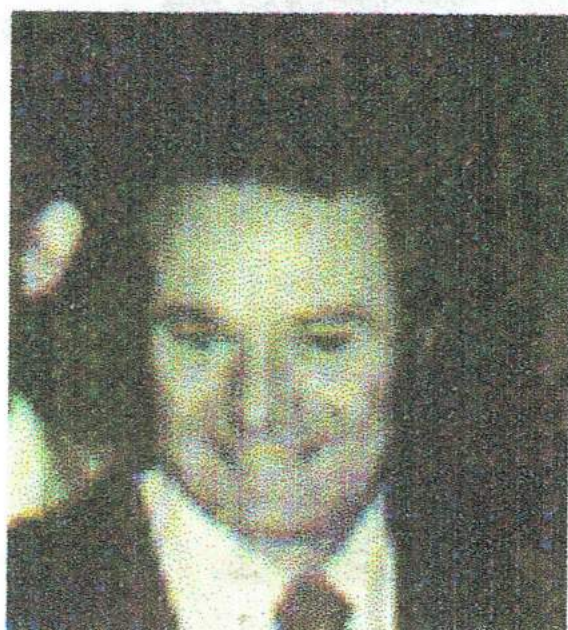


*Alice – our secretary  
and typist taken at the  
sendoff to George Bell  
on 29 June 1976*





*Max Anderson (left) and Trevor Leaver (right) Senior Engineer Construction. Trevor was responsible for all marine construction and maintenance works coming under the Public Works Department throughout the State, Trevor was at one time Resident Engineer at Bunbury Harbour Works and Fremantle Harbour Works.*



*Clive Gordon, who was the Manager of the Harbour and Light Department and whose Department worked in closely with the Harbours and Rivers Branch of the Pubic Works Department - Taken in 1976*



*Tom Lewis, the Under Secretary for Works including the Harbour and Light Department, Tom was also Chairman of the Fremantle Port Authority. Taken on 28 June 1976 at the send off to George Bell*





*Jim Butcher – Principal Assistant Engineer (2-IC)  
Jim was Resident Engineer at Wyndham and Fremantle harbour Works. He was Senior Engineer Investigations prior to being promoted to Principal Assistant  
Taken October 1977  
Jim had been Resident Engineer at Wyndham*



*Adrian Urquhart –civil engineer - At one stage Adrian was Resident Engineer at Esperance Harbour Works.*



*From left to right – Elsa and Max Anderson and Beth and John Gillespie. at a dinner to commemorate the conclusion of dredging by Hyundai in the new Harbour at Bunbury.*



## ACKNOWLEDGMENTS

Annual Reports of the Harbours and Rivers Branch of the Public Works Department. – Western Australia - unpublished

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Building a State – the story of the Public Works Department of Western Australia 1829 – 1985 - J.S.H. Le Page

Assorted brochures covering official openings of projects – Public Works Department - Western Australia

All photographs with the exception of the aerial view of the Bunbury Inner Harbour at page 75 were taken or arranged by the writer.

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To Trevor Leaver for reading and corrections.

Max Anderson  
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